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ABSTRACT

This study examined the problem of planned organizational and technological change in a university library catalog department implementing the shared cataloging system of OCLC, Inc. Information on the implementation experiences and problems of OCLC member libraries was gathered from published reports and on-site visits to three university libraries which have implemented the OCLC system. Research describing the impact of computer technology on other types of organizations was also examined in order to provide the context within which the investigation would be conducted. The issues presented by OCLC implementation are viewed as problems of control in two dimensions: a technical dimension primarily concerned with bibliographic control, and a social dimension concerned with human job behavior and job design. The implementation problem is seen as how best to reorganize the work, jobs, and staff into a cost-effective operation which meets both the requirements of network participation and the maintenance of an appropriate level of bibliographic control in the library's own records system. This analysis provides a conceptual framework for the development of effective implementation strategies for integrating other libraries into computer-based cooperative library cataloging support systems. References are provided after most chapters and the interview questionnaire used is appended. (Author/RBF)

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BIBLIOGRAPHIC CONTROL PROBLEMS AND ORGANIZATIONAL CHANGE ISSUES POSED BY THE IMPLEMENTATION OF A COMPUTER BASED CO-OPERATIVE CATALOGING SUPPORT SYSTEM

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by

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF BUSINESS ADMINISTRATION
IN THE DEPARTMENT OF ECONOMICS AND COMMERCE

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ABSTRACT

This research paper examines the problem of planned organizational and technological change with respect to a university library catalog department implementing the Shared Cataloging System of the Ohio College Library Center (OCLC) of Columbus, Ohio. Information on the implementation experiences and problems of OCLC member libraries was gathered from published reports and three on-site visits to university libraries which had implemented the OCLC system. As the literature on library automation is relatively weak in its assessment of the impact of computer technology on library organizations and staff, research describing the impact of computer technology on other types of organizations was examined in order to provide the context within which this investigation of library automation was to be conducted.

The issues presented by OCLC implementation may be viewed as problems of control in two organizational dimensions: (1) a technical dimension which is basically concerned with the complex issue of bibliographic control; and, (2) a social dimension concerned with the control of human job behavior which is largely determined by job design.

Because of the unfinished and developing nature of the OCLC services and the diversity of library catalog department organizational structures, it was judged not feasible nor desirable to present an ideal or model implementation solution which would be generally applicable to all university libraries. However, the two crucial issues of bibliographic control and job design were identified and the manner in which these two issues have been solved by three different university libraries was described.

This analysis provides a conceptual framework useful to library administrators who will be faced with developing effective implementation strategies for integrating other libraries into computer based coöperative library cataloging support systems. The implementation problem may be stated as how best to re-organize work, jobs, and staff into an effective and economical operation which both meets the requirements of network participation and at the same time retains an appropriate level of bibliographic control in the library's own locally created and maintained records system.

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INTRODUCTION

"Immediately upon embarking on a study of automation, one enters a political thicket; at issue are performance norms, standardization, organizational structure and reporting patterns, job analysis, time and motion studies, reassignments, retraining, and the upsetting of all former social and occupational stability."

Allen B. Veaner: "Major decision points in library automation." IN COLLEGE AND RESEARCH LIBRARIES, v.31, no.5, p.300.

"Surviving and thriving in this dynamic and complex world is chiefly a matter of perceiving the need to adapt in time to make the appropriate adjustments. The most reasonable concept of management is thus not that of a primary force changing the world, but of a mediating force adapting an organization to the world."

Thomas L. Whisler: INFORMATION TECHNOLOGY AND ORGANIZATIONAL CHANGE. Belmont, Calif., Wadsworth, 1970. p.7.

"OCLC is our current model system for interlibrary coöperation. It is designed to combine functions usually thought to be local with those of a network nature."

Frances Ohmes: "The other half of cataloging." IN LIBRARY RESOURCES AND TECHNICAL SERVICES, v.17, no.3, p.320.

The major problem faced by libraries integrating into a computer based coöperative library cataloging support system, once the implementation decision has been made, is the reorganization of work, jobs, and staff into an effective and economical operation which both meets the requirements of network participation and at the same time retains an appropriate level of bibliographic control in the library's local records system. This research paper examines the management problem of planned organizational and technological change with respect to a university library catalog department implementing the Shared Cataloging System of the Ohio College Library Center (OCLC) of Columbus, Ohio.

Information on the implementation experiences and problems of OCLC member libraries was gathered from published reports and three on-site visits made by the investigator in June 1975. One day each was spent at the libraries of Cornell University, the State University of New York at Buffalo, and Syracuse University. The questionnaire used to guide the interviews with the respective heads of Technical Processing and Catalog Departments is included in the appendix to this research paper.

The literature of library automation abounds with technical descriptions and details of the system and operation of OCLC and other computerized cataloging support systems. But this body of literature is relatively weak in describing and assessing the impact of these systems on the local library organization and staff. Because of this lack, the researcher has consulted and summarized the literature dealing with the impact of computer technology in other types of organizations.

It is believed that it is crucial in the management planning process to give sufficient attention to the human and social dimensions of proposed technological changes. Whisler has stated that with respect to adapting computer technology to manual systems, that deciding when, what, and how organizational changes are to be made is a difficult and a controversial process:

> "because uncertainty exists and because change imposes different costs and benefits on different members of the organization; the uncertainty and different impacts then make it difficult to obtain consensus among members of the organization." (1)

Before turning to the first chapter which summarizes the operation and function of cataloging in the university library and the OCLC Shared Cataloging System, several caveats should be emphasized. The description of the operation of the OCLC cataloging support system and its implementation in three university libraries is written at one place in time. What is true now, may well not be true several months from now. The OCLC system is at present incomplete, and is in a process of rapid growth and development. Of course all organizations undergo change over time; but OCLC is still in an initial design and development phase. It will have an increasingly profound effect upon its member libraries as many more local bibliographic files and functions are centralized and incorporated into various OCLC data bases and functional modules. The libraries described in the three case-studies are in media res of a profound technological transition. Their managements face an ongoing and intensive program of planned technological and organizational change. The real subject of this paper, and perhaps its value, lies in the attempt to clarify the organizational change issues which the OCLC implementation presents to the university library in two crucial areas:

(1) The largely technical considerations of bibliographic control which is so central to the proper functioning of, and the services offered by, the university library; and

(2) The human dimension of organizational change involving the control of human behavior to accomplish organizational ends, and fought out over such issues as job design, supervision, job security, pay, retraining, and overcoming resistance to change.

In this vein, it is not the intention of this research paper to evaluate the OCLC Shared Cataloging System, nor to present an ideal or model implementation solution for a university library adopting this OCLC functional module. Such an exercise would be of dubious value or use for at least two reasons.

First, it has already been stated that the Ohio College Library Center and its member libraries and regional networks are in the middle of a profound technological transition. There remains a good deal of uncertainty as to what the ultimate configuration of local and centralized functions and files will prove to be. Thus, any "solutions" offered here would soon be outmoded by new developments and requirements. Related to this is the problem of balancing short term solutions against long term needs dictated by the later developments and improvements in the OCLC functional modules. The central issue in this development is the continued existence of many locally created and maintained library files. One such issue relevant to the OCLC Shared Cataloging System and its Union Catalog is the continued existence of card catalogs in the local library. Many libraries are now seriously considering closing-off or even discarding such files. Many decisions on how the OCLC cataloging support system is implemented should be placed in the context of these types of considerations. This problem will be addressed in more detail later in this paper.

A second barrier to presenting an ideal implementation solution is the lack of standardization in university library organizations and service policies, combined with a lack of system performance measures. This is a major problem to be overcome in the development of coöperative automated library networks. Veaner has stated that:

> "Institutional uniqueness is characteristic of current library automation activities. Each library appears to be going its own way, applying automation in much the same fashion as it applies conventional methodology. There is little agreement on what to do, in what sequence it should

> be done, and how we should do it. In short, we lack a national plan for dealing with the intellectual and managerial problems of library automation efforts. Our current endeavors——save for establishment of the MARC II standard format——are as fragmented as the manual systems they are intended to replace. Do we want to create a series of incomplete local efforts?" (2)

If the 1960's were characterized by many fractionated attempts to create local library automated systems, the 1970's will surely be characterized by attempts to create coöperative automated library networks, in order to share the cost and risk of development and operation. The central problem in this process is the very diversity of library organizations and records systems; and how this diversity can be integrated into regional or even national files and processes. This is likely to be a prolonged process of trial and error.

Hamburg has discussed a related problem of library performance measures and existing library standards in his book, LIBRARY PLANNING AND DECISION MAKING SYSTEMS. In commenting about standards for budgeting, Hamburg states that none of the existing ones measure library performance:

> "Objectives are general statements of purpose, and performance measures are quantitative means of relating benefits (outputs) to costs (inputs). Library standards either are descriptive rules for 'proper' management or are quantitative rules for 'minimum' inputs of materials, personnel, and physical facilities. However, they are often considered [mistakenly] to be objectives or performance measures." (3)

In discussing the problems confronting the U.S. library community in building a national-level computer-based library/information network, a National Academy of Sciences report stated that it:

> "is no longer basically a technology feasibility problem. Rather it is the combination of complex institutional and organizational human-related problems and inadequate economic/value systems associated with these activities." (4)

and

> "No one has been able to determine the value of information in terms that allow the normal management and entrepreneurial mechanisms to shape the developments to improve the timeliness, accuracy, and selectivity of information systems. While it is desirable to strive for handling information systems in ways guided by conventional economic value analyses, planning and decision-making cannot depend upon such factors now." (5)

With respect to the three on-site visits to university libraries which have implemented the OCLC Shared Cataloging System, the researcher might have been able to evaluate the cost differentials between the three library implementation schemes by gathering uniform data on staffing, salaries, and productivity; but he would still face the difficult problem of placing a "value" on the resulting service differentials which the differing levels of bibliographic control achieve in the three libraries. The age and size of each library's files also affects the unit costs (this will be discussed in chapter 1). In addition, the problem of placing such implementation solutions into the context of the ultimate network development of OCLC and its requirements, makes such an undertaking a dubious exercise at best.

This researcher's experience of different implementation schemes in the three visited university libraries appears to be consistent with the comments of other observers. In a survey of the implementation experiences of various Ohio libraries, Allison states that:

> "Results seem to indicate no one striking model. Growth or decline of staff totals, alterations in work flow, departmental mergers or reorganizations seem determined by the mission of, and constraints on, an individual library. OCLC appears to be a support mechanism capable of unique, in-house adaptations, rather than a determining factor in what shall be done, or by whom. The on-line, shared cataloging system appears to be a tool used in a variety of ways without evidence of coercion towards homogeneity." (6)

If the above is truly the case at this stage of development, then library administrators should consider that they have a number of alternatives that may be considered in adapting the OCLC Shared Cataloging System to their organizations. It is hoped that this paper will be of some value in helping those planning such types of technological and organizational change to identify the bibliographic control and human issues, and to help clarify thinking in order to help develop effective strategies and solutions to particular library circumstances.

INTRODUCTION REFERENCES

(1) Whisler, Thomas L.: INFORMATION TECHNOLOGY AND ORGANIZATIONAL CHANGE. Belmont, Calif., Wadsworth, 1970. p.93.

(2) Veaner, Allen B.: "Major decision points in library automation." COLLEGE AND RESEARCH LIBRARIES, v.31, no.5 (September 1970) p.311.

(3) Hamburg, Morris [and others]: LIBRARY PLANNING AND DECISION-MAKING SYSTEMS. Cambridge, Mass., M I T Press, 1974. p.37.

(4) National Academy of Sciences, Washington, D.C. Information Systems Panel: LIBRARIES AND INFORMATION TECHNOLOGY: A NATIONAL SYSTEMS CHALLENGE; A REPORT TO THE COUNCIL ON LIBRARY RESOURCES. Washington, D.C., 1972. p.iv.

(5) Ibid., p.28.

(6) Allison, Anne Marie [and others]: "The impact of OCLC on cataloging departments—a study." NETWORK: INTERNATIONAL COMMUNICATIONS IN LIBRARY AUTOMATION, v.2, no.1 (January 1975) p.11.

CHAPTER 1: UNIVERSITY LIBRARY CATALOGING AND THE OCLC SHARED CATALOGING SYSTEM.

"The fundamental tenet of catalog construction is that works by and about an author or works about a topic should be brought together in one place in the catalog. This principle underlies the practice of establishing the form of heading for persons, places, corporate bodies, topics, etc., and using references from alternative forms to allow a variety of access points. In the absolute sense, this principle can be satisfied only by a single, open-ended catalog, provided that it remains continuously responsive to its users. As has been shown, however, the policy of revising older entries when a heading is changed entails many problems and a catalog with millions of entries gradually becomes so ponderous that it cannot be readily and economically kept up-to-date. This circumstance forces us to consider ways of modifying the pattern of catalog construction to achieve a viable compromise between principle and practice.

Richard S. Angell and John Rather: "The Library of Congress Card Catalog; an analysis of problems and possible solutions." IN THE FUTURE OF THE CARD CATALOG. Washington, D.C., Association of Research Libraries, 1975.

"The bibliographic record is central to the organization and administration of library materials and services. Application of automated techniques to this organization and administration emphasizes anew the central role of the bibliographic record. Library automation essentially is bibliographic file oriented and not procedure oriented. Availability of bibliographic records in machine readable form and provisions for constant updating of the volatile and frequently changing elements of these records are fundamental to successful library automation, even if difficult to attain."

Ritvars Bregzis: MACHINE READABLE BIBLIOGRAPHIC RECORDS; CRITERIA AND CREATION. Minneapolis, Minn., ERIC, 1970. p.5.

> "The major impact of telecommunication devices is not the fact that they let a library access a data base rapidly and over long distance. The major impact comes from the fact that many libraries can access a data base and interact in a coöperative mode. Thus in a coöperative cataloging network each user can use information input by other users. In this type of system, not only are equipment and systems costs distributed among members, but also input and cataloging costs can be shared among members."

Barbara Evans Markuson: COBICIL FINAL REPORT. Indianapolis, Indiana State Library, 1974. p.

A. CATALOGING IN THE UNIVERSITY LIBRARY

The major bibliographic tool, from the standpoint of use and cost, is the traditional card catalog which is created and maintained in the university library to provide access to the information contained in the library's collections. There are three major divisions of the traditional cataloging process which makes library materials available for use: descriptive cataloging, subject cataloging, and classification.

Classification provides a short notation system, which combined with other symbols, gives each book a unique address on the library's shelves, and at the same time arranges materials on related subjects adjacent to each other. Classification is supplemented with subject cataloging which consists of assigning subject index terms or phrases which describe each bibliographic item's subject content. These two complementary systems provide subject access to the library's collections.

This subject accessing system is largely confined to monographs in the library's collections. Libraries have been able to afford very little subject access to the contents of collected writings, periodicals, and other serial types of publications. In this latter area, libraries depend upon indexes and bibliographies produced outside of the library's locally created and maintained records system.

Descriptive cataloging is divided into two major aspects: (1) information transcribed largely from the title page which is used to give positive and unique identification to each bibliographic entity (including physical description of the item) contained in the library's collections; and, (2) a series of access headings which are assigned to each bibliographic record to facilitate retrieval of the record when inserted at various points in the card catalog. Subject cataloging is an analogous process of assigning subject access headings. Because various photoduplication processes and printing methods have long been used in manual catalog card production systems, there has been a tendency to duplicate the entire catalog record under each access heading assigned to a bibliographic entity.

In addition, catalog departments maintain an array of internal control files such as name authority, series authority, and subject authority files which are used to establish heading precedents and usage, and to control the making of appropriate references and explanatory notes in the various files maintained by the library.

The access headings or "entries" as they are usually called (because they determine the entrance in the catalog to a particular bibliographic record), are constructed according to an ever changing and evolving set of cataloging rules, one of whose functions is to insure that headings for persons, places, corporate bodies, titles, and topics have a unique and consistently assigned form, and are so constructed that they easily fit into logical and retrievable sequences in the alphabetical card files. The major objective is to gather all works by or about an author, or a topic, or all editions and versions of a single work, together in one area of the catalog. In addition, a cross-reference structure must be created and maintained from alternate forms of headings (not used) or to related headings (used in the file, but at different locations). The heart of cataloging consists in constructing unique headings; their consistent assignment; and the creation and maintenance of the cross-reference structure.

The cost of creating and maintaining these various manual card files increases with the size and age of the catalog. As the quotation by Angell and Rather suggests, the form of the file and its eventual size in the university library increasingly make it less responsive to needed changes or improvements. For instance, if one looks at any number of commercially created subject indexes to periodical publications, one may observe an ever evolving subject heading structure to meet new terminology usage and subjects. This is made feasible by the fact that there need not be strict continuity between the various time period cumulations of the indexes. On the other hand, card catalogs are maintained in one "eternal" cumulation. Any considered change in heading structure can involve bibliographic records entered into the catalog over as much as a fifty to seventy-five year period.

The cost of creating new catalog records, let alone changes in old records, with the use of professional librarian catalogers and a bevy of para-professional and clerical staff, has become so expensive, that there has been increasing dependence upon the use of catalog records created and distributed by the Library of Congress (LC) and to a lesser extent, other libraries. This has necessitated a good deal of record standardization; but not to the extent that most library administrators would desire. The now universal practice of using LC catalog records in university libraries in North America was achieved by the oldest and largest university libraries long after they had created their own files which incorporated a number of uniquely local cataloging practices and policies. In addition, the Library of Congress has been able to extend its timely cataloging coverage of a large share of materials purchased by university libraries only in the last two decades. The larger research libraries have continued to purchase many materials for which LC cataloging copy is not available.

Largely because of the above two factors, combined with the increasingly ponderous inflexibility of the very large catalog card files, complete standardization and interchangeability of catalog records has not been achieved. Angell and Rather have summarized the problem facing the university library catalog quite well as follows:

> "1. The larger the catalog, the higher is the unit cost of adding an entry to it. The rise in cost stems from the increased time required: (1) to establish personal and corporate names that are distinguished from those already in the catalog; (2) to establish and revise subject headings; and (3) to file the entries.
>
> "2. As the catalog grows, the addition of tens of thousands of new headings and the distinctions they require make it more complex. As a consequence, searching becomes increasingly difficult for the staff and public, and browsing is inhibited as large numbers of entries accumulate under many headings.
>
> "3. The larger the catalog, the less responsive it is to change. The expense of making changes tends to inhibit the adoption of better cataloging rules for entry and headings, the revision of outmoded subject headings, and the introduction of simplified filing rules." (1)

In addition, the problem of expense of preservation becomes a paramount issue as the age of the file results in increasing mutilation, damage, and loss of entries. Continued use of the card files makes the heavily used cards increasingly illegible.

The final demonstration of the dilemma posed by the large research library catalogs is what transpired in 1967, when the Anglo-American Cataloging Code was issued after many years of preparation. It called for a major revision in descriptive cataloging practice. The library community saw the need for the improved code, but it could not afford to make the radical switch in cataloging practice which the rules required. As a result, the Library of Congress, with the concurrence of the research library community, adopted its policy of "superimposition". LC agreed that libraries were stuck with most of the heading forms already established by previous codes, and that the new code would be used only to establish headings largely new to LC's own massive files.

It is not surprising, therefore, that many librarians early saw the possibility of using machine readable catalog files as a way to escape the dead hand of the past.

B: LIBRARY AUTOMATION AND BIBLIOGRAPHIC CONTROL

The expression "library automation" is perhaps a misnomer; but it is justified by common usage. The term "automation" as it is applied to libraries has a more narrowly defined meaning than is given to its usage elsewhere. For the most part, library automation has been the application of computer technology to various bibliographic files and the functions to which these files are directed. A few attempts have been made to apply operations research techniques to library problem solving. In addition, there has been increasing interest, but as yet little accomplishment, in the creation of library management information and control systems. An excellent state of the art summary of these last two aspects of library automation is contained in the work previously referred to, LIBRARY PLANNING AND DECISION MAKING SYSTEMS, by Morris Hamburg and others.

Most local library computer applications have been confined to bibliographic control systems in such areas as selection and acquisition, cataloging, and circulation and inventory control. Bibliographic control is used in at least two senses:

(1) Bibliographic control can simply refer to the totality of records systems used in any one library to access information about published works contained in the library's own collections or elsewhere.

Such files and records are used internally by the library staff to control the building and maintenance of its own collections; or they are used by the library's clientel to access information contained in published works, or other documents of recorded information.

These bibliographic records systems consist of an often vast combination of externally created bibliographic tools such as special bibliographies, indexes, abstracts, and, increasingly, automated information retrieval services. Secondly, this aspect of bibliographic control is achieved by an array of locally created and maintained records and files which exclusively access or control the use of the local library's own documents and materials in its own collections. The locally created files typically consist of such things as on-order and in-process lists, serials holdings lists, card catalogs, library loans lists, reserve lists, and other staff or user aides.

(2) Bibliographic control can also be used in the narrower sense of systems control used in the creation and maintenance of the local library's records and files. Reference has already been made to the catalog department authority files which are one such mechanism used to achieve bibliographic control of heading usage in the card catalogs.

It is in this latter, narrower sense that bibliographic control problems will be discussed with respect to the use of the OCLC Shared Cataloging System and the maintenance of the local library's card catalog.

Despite the many individual library developments of computer applications to bibliographic files and functions in the 1960's, Fussler believes that far-reaching improvements in library service and bibliographic control (in the broadest sense of that usage) will not be achieved until such activities are largely done on a regional and/or national basis, and largely outside the walls of the local library. (2) This researcher agrees with his judgement; but it still remains to be seen how quickly this will transpire, and how far such development will go. As already mentioned, libraries have increasingly come to depend upon all sorts of externally created bibliographic tools to achieve bibliographic control and access to information in their own collections.

The problem of bibliographic control examined in this paper might be stated as: How can the university library go about obtaining in as efficient and effective a manner, needed catalog records from the OCLC data base, and at the same time insure that such records are compatible and consistent with the records already in the existing local card catalogs? But from the point of view of the ultimate development discussed in the previous paragraph, the statement of the problem could be turned around as follows: How can local libraries be encouraged to contribute catalog records to the OCLC central data base which will be compatible and consistent with the needs of the central file, and all of the various access modes and services that will eventually be built around it; and which eventually must replace most of the local library manual files (including the ponderous card catalog) ?

The first question is the statement of a short-term problem. The second is a statement of the long-term problem. Each consideration can produce different answers that are, to greater and lesser degrees, in conflict with each other. This is the true nature of the technological transition being discussed: the shift of bibliographic control functions outside the walls of the local library to centralized agencies and files.

C: HISTORICAL BACKGROUND

The Ohio College Library Center of Columbus, Ohio was incorporated on July 6, 1967, as a not-for-profit corporation whose stated purpose was to establish, maintain, and operate a computerized regional library center to serve academic libraries of Ohio and designed so as to become a part of any future national electronic network for bibliographic communication. The Center's on-line Union Catalog and Shared Cataloging System was made operational in August 1971. A change in the articles of incorporation in March 1973, permitted expansion of OCLC service to libraries outside of Ohio. Within less than three years of the 1973 change, OCLC has grown from 50 Ohio member libraries to over 550 member libraries covering the U.S. eastern seaboard and stretching into many midwestern and western states. This is a success story without equal in twentieth century library history. On May 21, 1974, an amended purpose clause of the OCLC Articles of Incorporation was added as follows:

> "The purposes for which this corporation is formed are to establish, maintain and operate a computerized information processing and research center for development of programs, systems, and improved operational procedures in the field of library service and to gather, collect, maintain, index, and codify a central store of information, and furnish information from such a central store, and provide services and products for the benefit of libraries and library users." (3)

As stated earlier, implementation of the OCLC Shared Cataloging System impacts largely on one basic library function: cataloging and catalog maintenance. Utilization of this service is predicated on a technologically more sophisticated way for libraries to share the costs of creating and exchanging bibliographic records. In effect, the OCLC service fits logically into a long historical development which stretches at least as far back as the ideal first stated by Charles C. Jewett in 1853, when he proposed the preparation of a stereotype plate for each book cataloged by the Smithsonian Institution, so that other libraries could reap the benefit of work done in the Smithsonian Institution, and not duplicate it a hundred-fold in each separate library acquiring the same book for its own collections. Readers interested in this historical development of standardization in catalog records are referred to Paul Dunkin's CATALOGING U.S.A.

The Library of Congress made the major step towards standardization and interchangeability of catalog records when it introduced its catalog card service early in the twentieth century. It was partly the threatened breakdown of this card service, due to heavy demand and overload of the service, which led LC to develop the MARC II (machine readable cataloging) record format in the mid-sixties. The adoption of the MARC II catalog record format (actually there are a number of such formats for different types of records) as a national and then international standard was a crucial precursor to the establishment of a computer-based cataloging support system in a library network mode, as exemplified by the OCLC Shared Cataloging and Union Catalog System.

D: THE OCLC SHARED CATALOGING SYSTEM

The following discussion will assume the reader's basic familiarity with details of the organization and operation of the OCLC Shared Cataloging System. Many articles have been published which describe the system's operation. The reader might wish to refresh his/her understanding by referring to the article by Kilgore, Long, Landgraff, and Wyckoff, titled: "The Shared Cataloging System of the Ohio College Library Center", in the JOURNAL OF LIBRARY AUTOMATION, v.5, no.3 (September 1972) p.157–183.

The OCLC Union Catalog data base is built–up of catalog records supplied from two sources:

(1) LC—MARC II catalog records created and distributed on magnetic tape by the Library of Congress. As yet, these records issued in machine readable form do not represent the entire current cataloging output of the Library of Congress. The entire LC–MARC II corpus presently consists only of English language books cataloged by LC since 1969, and German and French books cataloged by LC since mid–1974. LC is gradually extending the coverage of catalog records issued in machine readable form to coincide with its entire output in at least those languages printed in the Roman alphabet.

(2) OCLC—MARC II catalog records input by the various OCLC member libraries. These records are converted and input by the OCLC member libraries at terminals which are hooked-up by telecommunication lines to the computer complex at Columbus, Ohio. The OCLC—MARC II catalog records may have been originated from a variety of sources within the individual member library; but there are usually two main ones: (a) Manual LC catalog records found in a number of possible printed sources; and, (b) catalog records originated by the member library itself (called original cataloging).

In the operation of the shared cataloging module, member libraries must first ascertain if a desired catalog record is already entered into the central data base by using a number of possible search/access keys at an OCLC keyboard—CRT screen terminal. If the catalog record, or a reasonably close version of the desired record is in the OCLC data base, it will be retrieved and displayed on the CRT screen. If the local library is in the cataloging mode, it may then compare the contents of the displayed record against the book which the terminal operator may have in hand. The terminal has a storage and program capacity, so that the terminal operator is free to make any desired additions, deletions, and changes to the displayed record. Upon completion of this edit process, the operator may push a transmit key which communicates the record as modified at the terminal back to Columbus, where it is:

(1) Read into a batch-mode catalog card production system which at the end of each working day produces all necessary catalog cards for each member library according to a pre-stored program of requirements called the library's profile. This profile determines the catalog card printed format and contents, and the number and sequence of the catalog cards. The cards are thus delivered to each library in daily batches of pre-sorted streams ready for insertion in the appropriate number of card catalogs.

(2) Read onto a magnetic tape of each library's "archive" files which are stored off-line. The archive file of machine readable records as modified by the individual member library is completely separate and independent of the original record from which it was derived and which is still stored in the central on-line data base.

At the time the member library orders catalog cards for a record it has retrieved, the library's identifying library symbol is added to the original on-line catalog record. This information is used for inter-library loan purposes. What must be emphasized here is that although a member library may make any modification of a record it retrieves from the data base to produce cards for its own files; no modifications are reflected or can be made to the on-line record stored in the central file. Another thing which should be noted is that there is little system control over member libraries adding duplicate records to the data base. If libraries fail to search the data base properly just prior to input of their own records, they may unwittingly add records already represented in the data base. This type of problem must be handled routinely with the merging of newly received LC-MARC II records. Prompt and accurate replacing of member-created records with official LC records has not always been satisfactorily achieved. On the other hand, there has also been some difficulty in getting member libraries to understand when they should not modify a record retrieved from the central file, but input their own cataloging as a new, and uniquely different record. To use an obvious example, a member library might retrieve a record for a book published in Spanish, and modify the record for a French version which it is cataloging. The library would obtain the correct catalog cards for the French version; but it would be listed in the central file as possessing the Spanish version; thus creating a potential problem for interlibrary loan requests.

When a catalog record cannot be found in the central data base by a terminal operator, then the member library has a number of options:

1. It may hold the book it wishes to catalog for some specified period before researching the OCLC data base, in the hope that LC or some other member library will meanwhile input the desired catalog record; or,

2. It may search through a number of printed bibliographic tools in order to find a pre-existing manual form of the desired record which it can then modify and input at the terminal; or, it may do original cataloging, creating the desired record whole-cloth, and input it.

When a member library inputs a catalog record new to the central data base, it does have considerable latitude over the content of the record which appears in the on-line data base. Although OCLC has specified the coding (i.e., OCLC version of the MARC II record tags) which must be present for input records, there is no similar requirement for the form of the headings which the library uses. Libraries are asked to use LC established headings and otherwise follow the requirements of the Anglo-American Cataloging Rules; but there remains areas of interpretation.

The major bibliographic control problem from the member library's point of view is being sure that the records which it finds in the OCLC data base are compatible with the records already in its own card catalogs. In a survey of OCLC member libraries conducted by Kennedy, it was discovered that "the most serious criticism from users of the system was the uneven quality of the cataloging entered into the data base by the participants." (4) In May 1972, less than a year after the installation of the OCLC on-line shared cataloging system, OCLC established an Advisory Committee on Cataloging to create record input standards for the membership. But as mentioned above, the standards are almost exclusively concerned with the MARC II content designators and their consistent utilization, rather than the actual content of each part of the record itself.

E. BIBLIOGRAPHIC CONTROL IN THE OCLC SHARED CATALOGING SYSTEM.

Most of the variance in the catalog records which are of major concern to a member library can be lumped into three areas of the catalog record: (1) the local library's book call number; (2) the local library's holdings and location information not contained as part of the book call number itself; and, (3) the headings assigned to the catalog record. The member library is also interested in the cross-references and information notes that must be created for some of these headings; but these are not part of the catalog record itself, although it is an integral part of the cataloging process. Variances elsewhere in the catalog record are not nearly so crucial from the local library's point of view, because the library can correct any typing errors which it notices, or make any other changes from information taken directly from the book while at the terminal. On the other hand, the terminal operator cannot know of any problems caused by variances in items (1) and (3) without comparing that information with the library's own files.

The subject of the next chapter will be an examination of the procedures and strategies which three university libraries have evolved to insure that the records which they obtain from the OCLC data base will be compatible with their own card catalogs and cataloging practice, while at the same time minimizing the amount of pre-checking that must be done for headings and book call numbers against the library's own catalogs before catalog cards are produced and inserted into the local card catalogs. Prior to OCLC implementation, cataloging activities in the local library are normally broken-down into a number of steps in order to insure the conformity of new records being added to its files, as well as to insure the orderly creation of the cross-reference structure. With the implementation of the OCLC Shared Cataloging System, these activities are telescoped into essentially one keyboard process at the terminals. Herein lies much of the economy to be realized from the system; but herein also lies the problem of unwittingly creating a number of heading and call number variances which must be coped with by the member library.

OCLC has been much criticized in some sectors for not incorporating a machine readable authority file with heading editing and reference creating ability; which at the same time would insure the absolute consistency of heading forms and uniqueness of book call numbers. This part of the cataloging process continues to be a responsibility of the local library. Local libraries are probably adequately seeing to the consistency of their own files; but certainly cannot be taking care of the necessary consistency in the central OCLC data base. An article which explains this bibliographic control problem from the point of view of the local library's own card catalogs has been published by Ohmes and Jones, titled: "The Other half of cataloging", in LIBRARY RESOURCES AND TECHNICAL SERVICES, v.17, no.3 (Summer 1973) p.320-329.

This researcher is a good deal more sanguine about this problem than have been some of OCLC's critics. The lion's share of heading compatibility is certainly achieved through the use of LC produced catalog records, whether via MARC II records or local library conversion and input of manual LC records. It is also difficult to imagine how 550 member libraries with staffs of differing talents and skills, and card catalogs with variant cataloging practices and histories, could be brought to agree to use only one version of a heading or book call number, especially as long as these libraries are tied to their own local card catalogs. Other solutions are of course possible. One could, for instance, carry variant forms of headings in the central data base, with one form designated as the "official" form. But all things have their price. Surely, the ultimate solution will be the closing-off or complete elimination (via retrospective conversion) of many of the local library card catalogs. At such a point in time, it would be entirely reasonable and desirable to implement a centralized authority file, and a tightly and centrally controlled edit system which insures a single, unique form for each heading, and consistent assignment of such headings to new catalog records being entered into the file servicing those libraries which have closed their local card catalogs and are henceforth dependent upon a centrally produced catalog product. Similar solutions have already been achieved or are close to achievement at the New York Public Library, the Washington Library Network based at Olympia, Washington, and the Ontario Coöperative University Libraries System based in Toronto, Ontario. The July 15, 1975 issue of the OCLC NEWSLETTER noted that OCLC was the recipient of another grant from Washington, D.C.'s the Council of Library Resources to assist in the development of on-line authority files as well as components of the on-line acquisitions subsystem, and the OCLC/Batelle subject search index. It should also be noted that the Library of Congress is also working on the automation of its own authority file system. In a similar vein, the reader should also be aware that LC and the research library community is beginning to come to grips with the idea of closing their ponderous card catalogs. Progress in this area has been reported by the Association of Research Libraries in a recent publication, THE FUTURE OF CARD CATALOGS. These problems will be solved, it is only a matter of time.

CHAPTER 1 : REFERENCES

(1) Richard S. Angell and John Rather: "The Library of Congress Card Catalog; an analysis of problems and possible solutions." IN THE FUTURE OF CARD CATALOGS. Washington, D.C., Association of Research Libraries, 1975, p.46-48.

(2) Fussler, Herman H.: RESEARCH LIBRARIES AND TECHNOLOGY; A REPORT TO THE SLOAN FOUNDATION. Chicago, The University of Chicago Press, 1973, p.31.

(3) OCLC ANNUAL REPORT, 1974/75, p.11-12.

(4) Kennedy, John P.: THE FEASIBILITY OF ESTABLISHING AN OCLC-TYPE CENTER IN THE SOUTHEAST. FINAL REPORT. Atlanta, Ga., 1973, p.20.

CHAPTER 2: BIBLIOGRAPHIC CONTROL SOLUTIONS OF THREE UNIVERSITY LIBRARIES.

"Cataloging is a bibliographical language and... like any language, it is a good tool for communication to the extent that it is standard——not necessarily to the extent that it is strictly logical or even to the extent that it always fits the particular needs of individual users."

Paul S. Dunkin: CATALOGING U.S.A. Chicago,
American Library Association,
1969. p.151.

"The design of OCLC, with its copy displayed on a terminal screen in a fixed position away from the card catalog, seems to imply that interaction with the card catalog during the catalog building process is not necessary. .... In its inability to interact with the local catalog the OCLC system fails to be of help to the cataloger in providing an expeditious way to make the catalog consistent."

Frances Ohmes and J.F. Jones: "The other half
of cataloging." IN LIBRARY
RESOURCES AND TECHNICAL SERVICES,
v.17, no.3, Summer 1973. p.325.

"OCLC does not conceive of its mission as merely the mechanization of library procedures of the past, but it does recognize that you have to start where you are and extrapolate towards where you would like to go, always, however, maintaining contact with the ground."

Judith Hopkins: "The Ohio College Library
Center." IN LIBRARY RESOURCES
AND TECHNICAL SERVICES, v.17,
no.3, Summer 1973. p.309.

The three university libraries used as case studies in this paper are members of a regional library network called FAUL (Five Associated University Libraries). It has become the common practice for those libraries outside of Ohio to enter into association with OCLC via such mediating agencies as FAUL. One may think of a number of advantages to such an arrangement. Regional networks are almost certainly able to negotiate better contracts with OCLC than can the individual library. Such organizations carry more weight and influence in getting the needs of their members satisfied, than can an individual library standing alone. Collectively they represent a large source of income to the Center. There are advantages to OCLC as well. There is only one agency to deal with, rather than five or many more. It is probably easier and cheaper to design and set up telecommunication links to a group of geographically related libraries at one time.

A regional network can facilitate implementation in the local libraries by conducting feasibility studies to justify OCLC implementation to the local library's university administration, by acting as an exchange for solving of implementation problems, by providing resource personnel for staff training and other such services.

Attention will now be turned to the Libraries of the State University of New York at Buffalo, Syracuse University, and Cornell University.

A. LIBRARY OF THE STATE UNIVERSITY OF NEW YORK AT BUFFALO

The Library at SUNY Buffalo had very little experience with library automation prior to the installation of its three OCLC terminals in November 1973. There was a minimum of staff participation in Buffalo's implementation decision; and little planning was done prior to installation except for the legal-fiscal arrangements and the development of the catalog card profile and pack definition tables. The profile and pack definition tables were written in February 1973. They determine the amount of information and its format on the catalog cards, as well as the number of cards produced and their computer-sorted streams for the various card files maintained by the library. The implementation of OCLC at Buffalo coincided with a complete turnover of the managerial staff in technical services (i.e., the Assistant University Librarian for Technical Services and the Heads of the Catalog, Acquisitions, and Serials Departments). The burden of implementing the changeover fell upon the new Head of the Catalog Department who did not arrive until the late summer of 1974. It is not surprising, considering these circumstances, that Buffalo experienced some difficulty in implementing the OCLC Shared Cataloging System.

The new Head of Cataloging felt that many of the difficulties might have been avoided if the card profiling process had been utilized as an opportunity to revise the old manual system in order to make more effective use of the OCLC system. Other libraries have used this phase of the OCLC implementation process as an opportunity to reappraise the existing system and to plan for any necessary changes.

Prior to the reorganization of the Buffalo Cataloging Department in the fall of 1974, terminal operators called-up OCLC records, compared them against the book in hand, and made any changes at the terminal keyboard before ordering catalog cards. In addition, manual LC-copy records were input at the terminals with little local authority checking. These two practices resulted in a large number of call number and heading variances to the local catalogs, discovered only after the cards were delivered by OCLC and filed into the various local catalogs. A large part of the staff resources were shifted to making corrections on cards and books manually as problems were discovered in the filing process. Productivity of new cataloging in the Department dropped. By November 1974, a year after installation, a 20,000 volume cataloging backlog had developed. Arrangements were made to warehouse the books outside of the library building.

By this time there was a great deal of administrative concern about the lowered productivity in the Department. The Head of the Catalog Department set about making changes in the organization and assignment of staff in order to increase the Department's cataloging productivity. The Department was reorganized into three units: (1) Original Cataloging Section; (2) Systems Cataloging Section; and (3) Systems Support Section.

FIGURE 1 : STATE UNIVERSITY OF NEW YORK AT BUFFALO LIBRARY CATALOG DEPARTMENT ORGANIZATION AND FUNCTIONS

1. SYSTEMS CATALOGING SECTION——RESPONSIBLE FOR:

   a. All catalog record search activities on the OCLC terminals.
   b. Searching for manual LC records in various bibliographic tools.
   c. Coding and input of manual LC records after they have been processed by the Systems Support Section.
   d. Input of cataloging done by the Original Cataloging Section.

2. ORIGINAL CATALOGING SECTION——RESPONSIBLE FOR:

   a. Doing all necessary original cataloging.
   b. Doing requisite heading verification, authority work, generation of cross-references, etc. as required for all original cataloging.
   c. Typing coding sheets used as input forms for original cataloging.
   d. Helping the Systems Cataloging Section with searching for manual LC copy and its preparation prior to input by the Systems Cataloging Section.

3. SYSTEMS SUPPORT SECTION——RESPONSIBLE FOR:

   a. Checking headings of catalog records found in the OCLC data base against the public catalog and series authority file, and at the same time checking that the book may be a duplicate of a book already cataloged by the Library.
   b. Filing of cards received from OCLC into card catalogs.
   c. Physical preparation of books, typing of authority and reference cards.
   d. Maintenance of the OCLC Daily File—and adding additional information onto OCLC catalog cards before filing them.
   e. Returning any sheets for cards not received back to the Systems Cataloging Section for re-entry on the OCLC terminals.

FIGURE 2: PARTIAL FLOW DIAGRAM OF BUFFALO PROCESS:

PT. 1: CATALOG RECORD SEARCH PROCESS.
(Systems Cataloging Section)

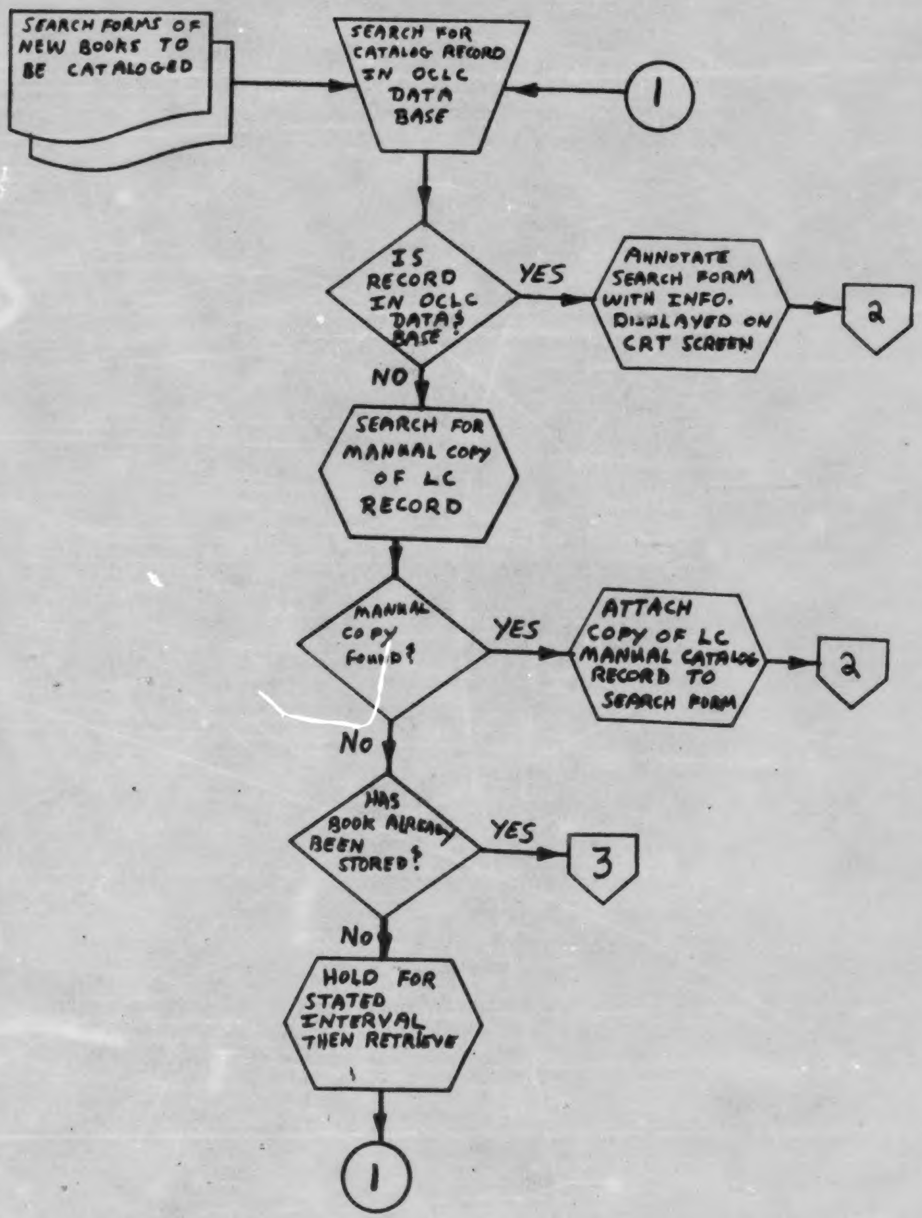

SEARCH FORMS OF NEW BOOKS TO BE CATALOGED
SEARCH FOR CATALOG RECORD IN OCLC DATA BASE
1
IS RECORD IN OCLC DATA BASE?
YES
ANNOTATE SEARCH FORM WITH INFO. DISPLAYED ON CRT SCREEN
2
NO
SEARCH FOR MANUAL COPY OF LC RECORD
MANUAL COPY FOUND?
YES
ATTACH COPY OF LC MANUAL CATALOG RECORD TO SEARCH FORM
2
No
HAS BOOK ALREADY BEEN STORED?
YES
3
No
HOLD FOR STATED INTERVAL THEN RETRIEVE
1

FIGURE 3 : PARTIAL FLOW DIAGRAM OF BUFFALO PROCESS:

PT. 2: VERIFICATION PROCESS.
(Systems Support Section)

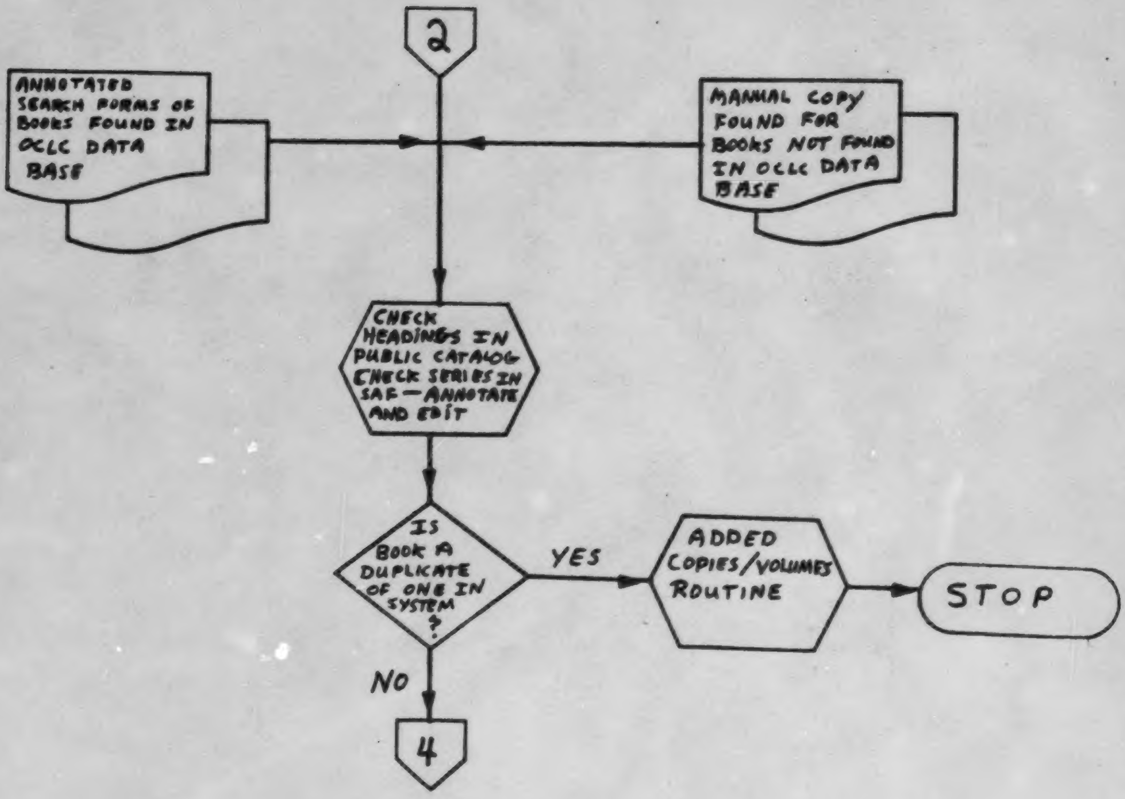

2
ANNOTATED SEARCH FORMS OF BOOKS FOUND IN OCLC DATA BASE
MANUAL COPY FOUND FOR BOOKS NOT FOUND IN OCLC DATA BASE
CHECK HEADINGS IN PUBLIC CATALOG CHECK SERIES IN SAF—ANNOTATE AND EDIT
IS BOOK A DUPLICATE OF ONE IN SYSTEM ?
YES
ADDED COPIES/VOLUMES ROUTINE
STOP
NO
4

FIGURE 4: PARTIAL FLOW DIAGRAM OF BUFFALO PROCESS:

PT. 3: ORIGINAL CATALOGING PROCESS.
(Original Cataloging Section)

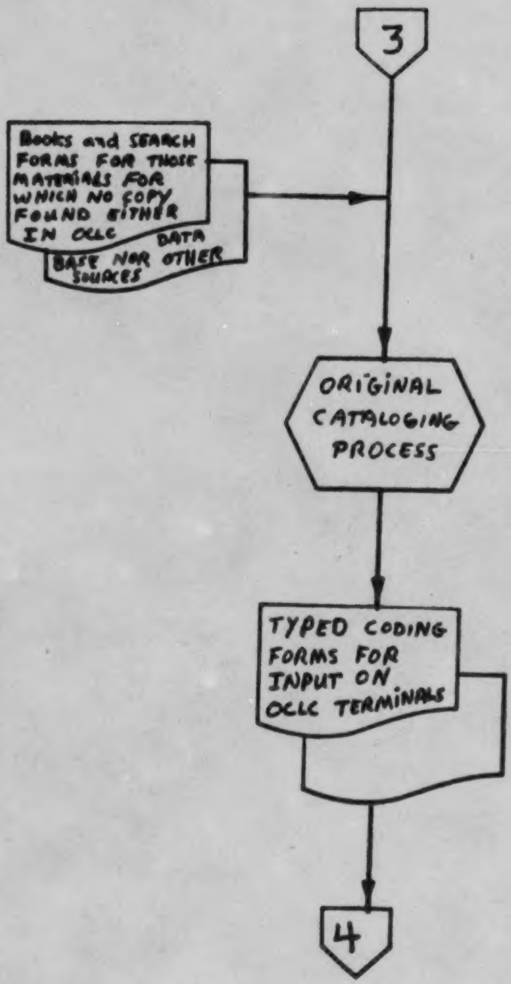
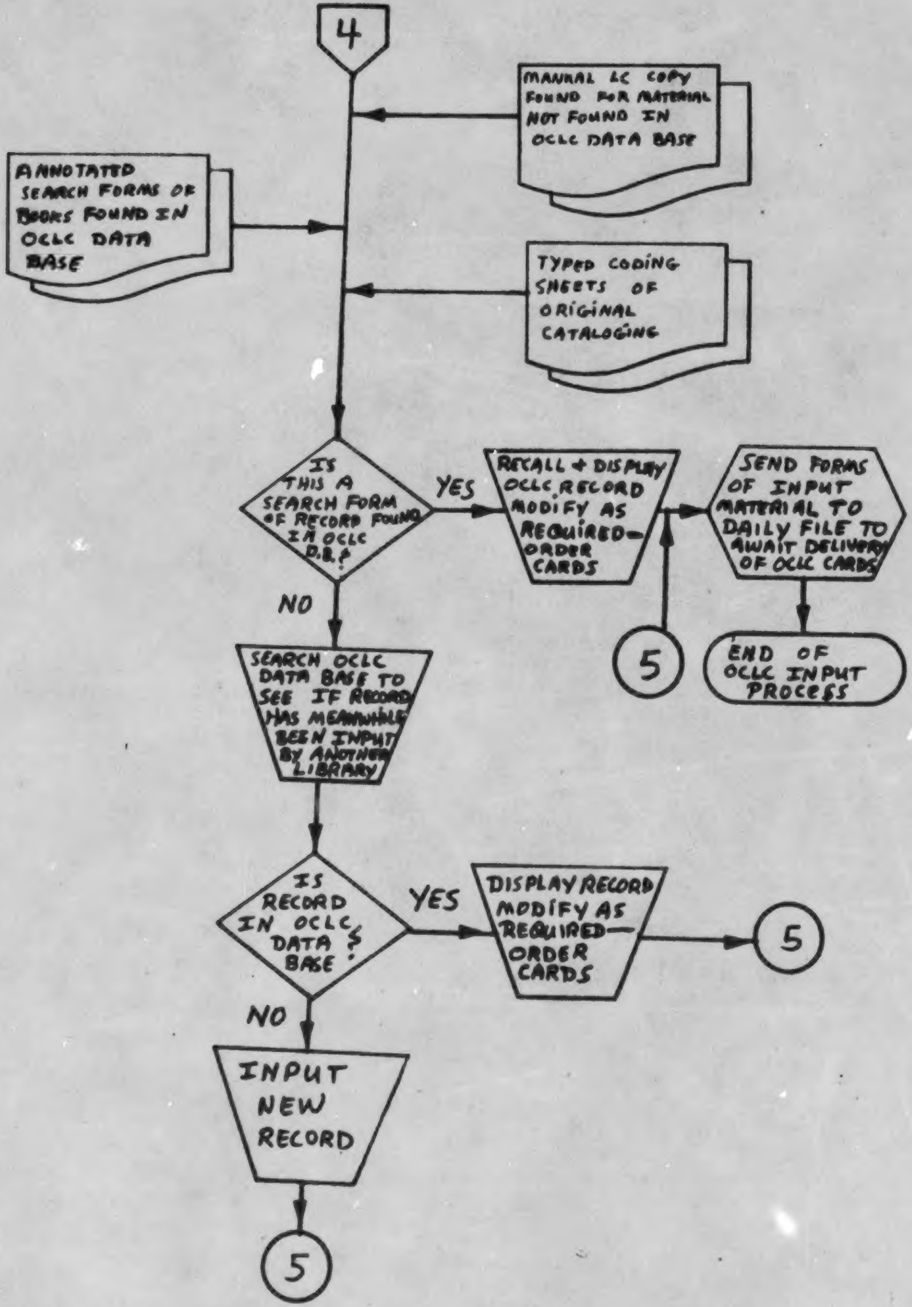

3
Books and SEARCH FORMS FOR THOSE MATERIALS FOR WHICH NO COPY FOUND EITHER IN OCLC DATA BASE NOR OTHER SOURCES
ORIGINAL CATALOGING PROCESS
TYPED CODING FORMS FOR INPUT ON OCLC TERMINALS
4

FIGURE 5: PARTIAL FLOW DIAGRAM OF BUFFALO PROCESS:

PT. 4: RECORD INPUT PROCESS.
(Systems Cataloging Section)


4
MANUAL LC COPY FOUND FOR MATERIAL NOT FOUND IN OCLC DATA BASE
ANNOTATED SEARCH FORMS OF BOOKS FOUND IN OCLC DATA BASE
TYPED CODING SHEETS OF ORIGINAL CATALOGING
IS THIS A SEARCH FORM OF RECORD FOUND IN OCLC D.B.?
YES
RECALL + DISPLAY OCLC RECORD MODIFY AS REQUIRED—ORDER CARDS
SEND FORMS OF INPUT MATERIAL TO DAILY FILE TO AWAIT DELIVERY OF OCLC CARDS
5
END OF OCLC INPUT PROCESS
NO
SEARCH OCLC DATA BASE TO SEE IF RECORD HAS MEANWHILE BEEN INPUT BY ANOTHER LIBRARY
IS RECORD IN OCLC DATA BASE?
YES
DISPLAY RECORD MODIFY AS REQUIRED—ORDER CARDS
5
NO
INPUT NEW RECORD
5

The Systems Cataloging Section became responsible for all terminal searching and input activities. This Section was formed by assigning one of the professional librarian catalogers as the Section's supervisor, and stripping the clerical support staff away from the previous structure of cataloging teams which were assigned to particular subjects and language groups cataloging. Each cataloger librarian had previously worked with a clerk who did much of the routine checking and typing for the librarian cataloger. These teams had done all types of cataloging (copy or original) within each subject and language specialty assigned to the team.

Under the present arrangement, the terminal operators in the Systems Cataloging Section perform all searches for catalog records in the OCLC data base. If the desired record is found, the operators copy information from the CRT display screen by hand onto a search form. This search form is processed by the Systems Support Section before it is returned to the terminal operators for edit and input.

Two shifts on the three terminals were created by using normal staff turnover and replacing outgoing operators with personnel willing to work the late afternoon—evening shift. Operators are scheduled on the terminals two hours at a time. They alternate two hours off by searching for manual LC copy in various bibliographic tools.

The Systems Cataloging Supervisor must be sure that the OCLC terminals are occupied at all times so that the maximum amount of work can be done on them. Scheduling is revised and posted; and operators not able to meet their schedule are replaced by other staff members. This has meant that staff on the terminals are more carefully controlled as to their whereabouts and when they do certain jobs. There has been a desire on the part of the administration to extend the shifts into the late evening, but extra money for the shift pay differential has not yet been found.

The Original Cataloging Section was formed from the remaining ten professional librarian catalogers. This Section is supposed to do only original cataloging. Its output consists of typed coding sheets designed for easy input on the OCLC terminals by the terminal operators. These cataloger librarians must now do their own typing, heading verification "leg work", and cross-reference authority work; because they lack the support of the former clerical staff stripped away from the cataloging teams to form the Systems Cataloging Section. Because of the large cataloging backlog and the administrative concern to get as many books processed as quickly as possible, the cataloger librarians have been temporarily assigned to assist the clerical staff in the Systems Cataloging and Systems Support Sections with manual LC copy searching, heading verification, and edit—coding of manual LC copy for terminal input.

The Systems Support Section was formed from the old Catalog Maintenance and Card Production Units (i.e., card filing and corrections, and card typing). The supervisor of the previous Catalog Maintenance Unit became the supervisor of the Systems Support Section.

Most of the administrative attention and training has been centered upon getting this Section properly functioning. By contrast, the terminal operators were able to learn their jobs quickly. Teaching the Systems Support staff to do a proper verifying and editing job against the public catalogs has been a time consuming task. This activity had formerly been carried out by the personnel making up the former cataloging teams. The Systems Support Section continues to do card filing, corrections, and a certain amount of manual card typing. All series are checked in the series authority file. Series entries have been the primary source of variance in the OCLC data base records. All headings are checked against the public catalog. Because of problems in the Acquisitions Department, the Systems Support Section duplicates much of the pre-order search routine; and checks for duplicate copies and added editions. This was previously a source of problems of book call numbers for duplicates and successive editions. The shelf list is not checked prior to terminal input, and this has continued to be a small source of problems with call numbers. Usually the cards and book label can be adjusted after receipt of the cards from OCLC when the discrepancy is found by filing the shelf list card. Usually a single digit to the cutter numbers or adding the date of publication rectifies involuntary duplications of book call numbers already assigned to other books. It should also be noted here that any changes made to catalog records are not updated on the Library's machine readable archive record; so that the Department is introducing discrepancies between its manual and machine records stored in the archive files. Whether this is a problem depends upon any future plans to utilize the data in the archive files.

Although OCLC does provide error reports for some types of terminal operator errors to each member library, the reports are so delayed in coming that they have not provided useful corrective feedback. Also no pattern in the error reports has been discerned that could lead to any changes in the Department's policy or procedures. In addition, the record of who has worked on various parts of the cataloging process of a record is maintained manually through a system of initials on the search forms, coding sheets, and backs of title pages. The present OCLC system design does not provide for any tighter control in the sense of error feedback directly to the operators.

Because the Buffalo card profile and pack definitions were not done as carefully as they might have been done, and because new catalog files were added to the library after profiling, the Systems Support Section is forced to maintain a "Daily File" against which the OCLC card receipts are checked—so that certain cards can be pulled for further processing—such as adding additional holdings information not incorporated into the terminal input operation. All work sheets of records entered on the terminals each day are placed into a separate "daily" folder. Extra card sets ordered for the new catalog files are pulled from the main catalog card streams. An update in the Buffalo profile will eventually correct this problem.

The Daily File also acts as a control file to make sure that all required card sets are received from OCLC. OCLC does produce "E" (error) cards for titles not produced, either because of terminal operator error, or because of any number of systems problems or failures in the transmission. The original input forms for E-cards are pulled from the Daily Files and re-input on one of the terminals.

With the changes made in the Buffalo system, productivity has climbed back to its former level prior to OCLC installation. Increasing proportions of catalog copy are found in the OCLC data base on first time search, because the number of OCLC members inputting records is growing. The Buffalo Library management's preoccupation with productivity of the Department's new cataloging has created the demand to establish formal production standards for each activity. At the time of the interview, there was a great deal of dissatisfaction expressed with the productivity in the Original Cataloging Section. This problem will be discussed in the chapter on job design.

In summary, systems control at Buffalo has been achieved through a reorganization of functions into three new administrative units, with one unit responsible for all OCLC terminal activity; through the instituting of heading checking prior to card production; and through formal establishment of production standards for each activity. The Buffalo Library management is satisfied with the OCLC service, and looks forward to further module developments in the OCLC system.

B. SYRACUSE UNIVERSITY LIBRARY

Syracuse University Library implemented OCLC at the same time as Buffalo. Unlike Buffalo however, Syracuse had a decade of extensive experience with library automation. Syracuse is presently operating a non-MARC record, on-line, integrated acquisitions-cataloging-circulation records system. Its OCLC implementation was made smoothly with a minimum of organizational changes. The primary problem at Syracuse has been the attempt to interface the OCLC system and records with its own local computer system. Complete success had not been achieved at time of the interview. And there remains a good deal of uncertainty as to what impact the other OCLC module developments will have on the utilization of the local system at Syracuse. For instance, the Syracuse administration must decide whether to continue to use its own acquisition module when the OCLC acquisition system is operational in the near future.

The Syracuse Catalog Department does not have any professional librarian catalogers and does not do any original monograph cataloging. Serials cataloging is done by professionals in the Serials Department. The OCLC data base has only recently began to make provision for entry of serials records via the CONSER Project. The potential impact of the OCLC serials system on the Syracuse serials system had not been considered at time of the interview. Monograph cataloging is strictly a clerical operation by intent and design at Syracuse. This organizational arrangement was made before any thought was given to the utilization of the OCLC Shared Cataloging System. A primary concern by the administration of the Syracuse University Library has been to minimize processing labor costs wherever possible.

With the reorganization of the cataloging activities several years prior to OCLC implementation, the Syracuse librarian catalogers were transferred to one of the eight subject collection divisions in the public service side of the Library. Each subject collection division is responsible for providing its own information and reference service, in addition to the responsibility for building the Library's collections in the assigned subject area. The decentralization of acquisitions tasks (except for ordering and payment) was made possible by the Library's own integrated on-line system. All selection and pre-order searching activities are accomplished in the various subject divisions. Duplicate searches are performed in these divisions using a terminal hooked into Syracuse's own computer facility. In addition, three OCLC terminals have been installed for use by the eight subject divisions to permit the searching and capturing of bibliographic data onto manual order request forms. Input to the local Syracuse system is in batch-mode rather than on-line. This input mode achieves security and control of records input by limiting the input devices in the technical services area and staff. As Syracuse's cataloging records are added to the OCLC data base, and this data base grows, it will also serve to eliminate many duplicate searches in the Library's own locally maintained data base. LC proof slip files have not been maintained since 1968; but LC proof slips are received in subject batches and are used as selection aides by the collections librarians. These LC catalog record proof slips are used for input when the record is not found in the OCLC data base. This same practice with regards to LC proof slips is followed by both libraries of Buffalo and Cornell also.

An additional three OCLC terminals were installed in the Syracuse Catalog Department. A staff of six terminal operators doubling up on the terminals in one shift are able to handle about 40,000 titles (or 70,000 volumes) per year. The terminal operators were formed from two former units in the Department: (1) the Fast Cataloging Unit, and (2) the Pre-Cataloging Searching Unit. The number of staff positions was decreased through attrition at time of the OCLC implementation, because OCLC reduced the amount of manual record searching that needs to be done. The old card production unit using a 1-2-3 Xerox paste-up process has been eliminated. The terminal operators, as at Buffalo, alternate two hours on the terminals and two hours off the terminals doing manual searching for LC-copy of records not found in the OCLC data base. The amount of manual searching which needs to be done is gradually reduced over time as more record inputting member libraries are added to the OCLC system.

The OCLC terminal operation at Syracuse is designed so that the operators can perform the whole process of searching, editing, and card ordering as one unbroken keyboard operation. Many records in the OCLC data base are identified at time of selection in the various subject collections divisions; and the records are re-accessed in the

FIGURE 6 : PARTIAL OUTLINE OF SYRACUSE FILE CONTENTS AND CATALOG DEPARTMENT FUNCTIONS

1. SYRACUSE ON-LINE FILE CONTAINS:
    - a. All library books which are on-order.
    - b. All books received and in-process of being cataloged.
    - c. All books stored in the un-cataloged sections.
    - d. All books which have been cataloged.
    - e. All books which are currently out on-loan.
    - f. Access by author, title, and series, but lacks subject access.

2. SYRACUSE CARD CATALOG CONTAINS:
    Only those books which have been cataloged.
    Only file which permits subject access at this time.

3. OCLC UNION CATALOG AND DATA BASE:
    All Syracuse books cataloged since the end of 1973.

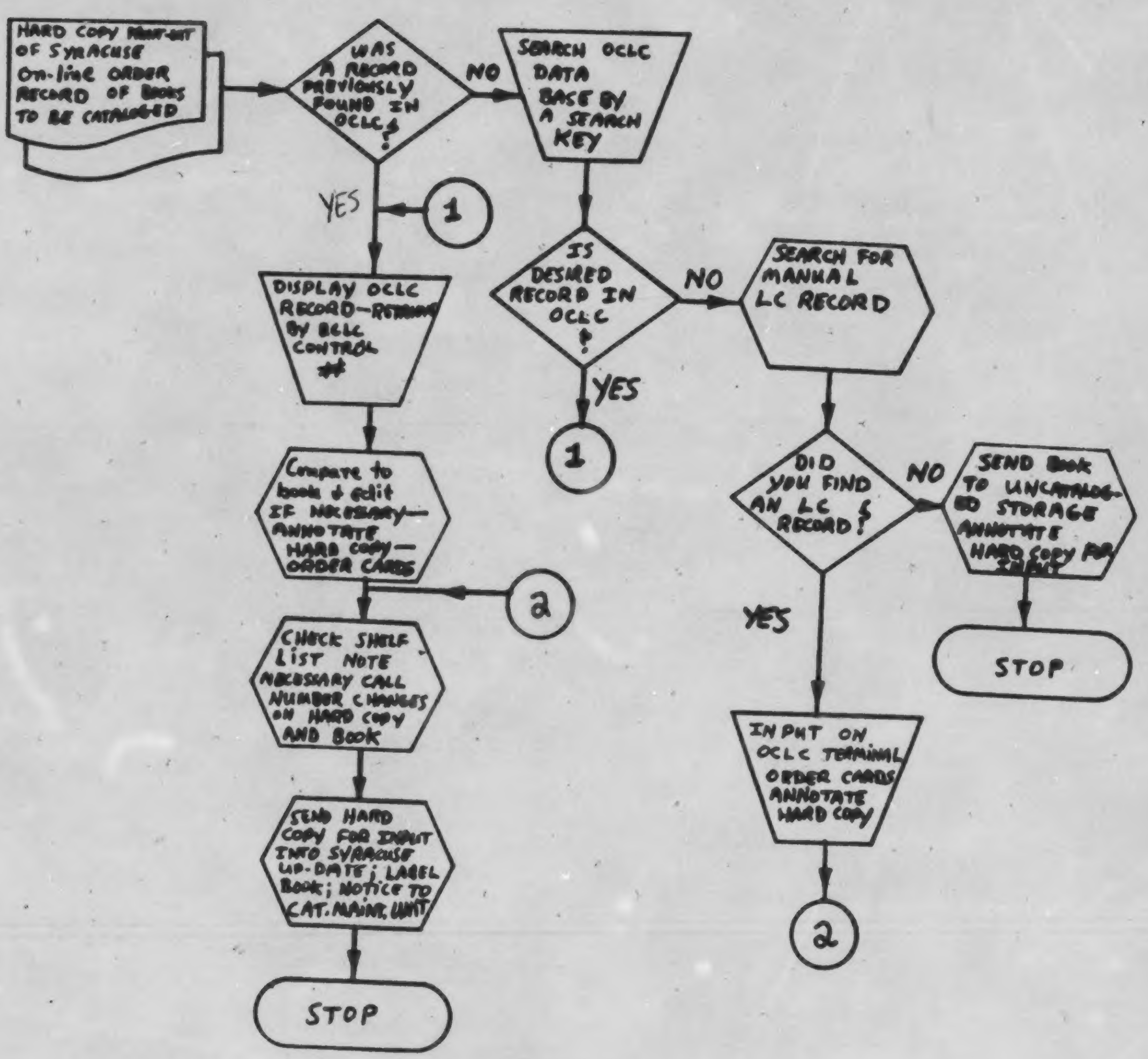
SYSTEMS CATALOGING UNIT FUNCTIONS:

1. Searching and cataloging on OCLC terminals.
2. Searching of manual LC records for those not found in the OCLC Union Catalog and data base.
3. Edit comparison of Syracuse On-line book record with the OCLC or LC catalog record; adjustment of Syracuse on-line record for compatibility.
4. Checking of shelf list for records newly entered onto OCLC system; done prior to book labelling; adjustments of book call numbers made upon receipt of catalog cards from OCLC.

CATALOG MAINTENANCE UNIT FUNCTIONS:

1. Adjustment of any call number discrepancies found in shelf list check on the catalog cards after their receipt from OCLC.
2. Filing of catalog cards in card catalogs.
3. Adjustment of any heading discrepancies on catalog cards as discovered during the filing process.

FIGURE 7: PARTIAL FLOW DIAGRAM OF SYRACUSE MONOGRAPH CATALOGING PROCESS.


HARD COPY PRINT-OUT OF SYRACUSE On-line ORDER RECORD OF BOOKS TO BE CATALOGED
WAS A RECORD PREVIOUSLY FOUND IN OCLC?
NO
SEARCH OCLC DATA BASE BY A SEARCH KEY
YES
1
DISPLAY OCLC RECORD—RETRIEVE BY OCLC CONTROL #
IS DESIRED RECORD IN OCLC?
NO
SEARCH FOR MANUAL LC RECORD
YES
1
Compare to book & edit IF NECESSARY—ANNOTATE HARD COPY—ORDER CARDS
DID YOU FIND AN LC RECORD?
NO
SEND Book TO UNCATALOGED STORAGE ANNOTATE HARD COPY FOR INPUT
2
CHECK SHELF LIST NOTE NECESSARY CALL NUMBER CHANGES ON HARD COPY AND Book
YES
STOP
INPUT ON OCLC TERMINAL ORDER CARDS ANNOTATE HARD COPY
SEND HARD COPY FOR INPUT INTO SYRACUSE UP-DATE; LABEL Book; NOTICE TO CAT. MAINT. UNIT
2
STOP

Syracuse Cataloging Department using the OCLC record control number rather than the algorithm search keys. This makes for faster retrieval at time of cataloging. However, the OCLC control number is replaced by the Syracuse local system control number on the catalog cards and in the OCLC archive records for Syracuse. This is being done in order to help match the archive records against the local Syracuse on-line catalog records in order to eventually eliminate the extra input process from the annotated hard copies of the Syracuse records after ordering OCLC catalog cards. In addition, this control number on the catalog cards permits corrections clerks to re-access the local data base record directly from the catalog cards——useful when making changes on catalog cards and the Syracuse data base record.

No heading checking or shelf listing is done prior to OCLC input. A major concern of the Syracuse Library management has been to maximize productivity at the OCLC terminals. The shelf list is checked after input, and any problems are noted so that cards can be extracted from the filing streams received from OCLC before filing into the card catalogs. Changes to call numbers are infrequent enough to justify this process because Syracuse has always, unlike Buffalo and Cornell, accepted and used LC assigned call numbers without modification. Headings are verified at the time the OCLC printed catalog cards are filed into the various catalogs. The Catalog Maintenance Unit adjusts the headings on the cards as is necessary; and also inputs the same changes into the Syracuse on-line record equivalent of the catalog cards. Since no authority files are maintained, cross-references and information notes are kept to a bare minimum. The interface between the OCLC records and the Library's On-line records for the in-house system, is largely handled at the time of the input on the OCLC terminals by annotating the hard copy of the Syracuse on-line record with necessary additions and changes for input in a batch-mode process mentioned earlier. This hard copy is produced as part of the purchase order record at time of ordering the book. The Library Systems Office is presently attempting to use the OCLC archive tape record to update its own record automatically——thus eliminating one keyboarding step in the present operations.

Original cataloging is not done. Books for which copy is not found in either the OCLC data base or in manual bibliographical tools are stored in the appropriate subject divisions in a separate section of shelving by the control number used for the circulation system. This same number appears on the catalog cards of the cataloged books. The local system produces spine labels for the uncataloged books. But a Selin labelling system is presently used for classified books. Management is presently considering the placing of several professional librarian catalogers back into the Cataloging Department to do the original cataloging.

The card catalogs do not contain any record of the "uncataloged" books. But these books, in addition to the rest of the cataloged books are contained in the Library's own on-line system which also reports books which are on-order, in-process, and out on-loan to borrowers. Since a subject index has not been built for the on-line system, the card catalog has been continued in parallel to the machine system.

In summary, it can be seen that most of the bibliographic control at Syracuse is achieved in three stages:

1. Control for pre-ordering activities is achieved outside of the Processing Departments. It is decentralized in each subject division of the library system; and searching is done via the Library's own terminals and on-line data base. Searching is also done on the OCLC terminals. All information is copied by hand onto an order request form for input by the Order Department onto the Syracuse data base.

2. Interface between the OCLC system records and the local on-line system is achieved at the time of record production on the OCLC terminals. Record variances are noted on the hard copy of the local system's order record for the title being cataloged. This is later input as an up-date of the equivalent record in the Syracuse data base.

3. Control in the card catalog is kept to a bare minimum and is achieved at the end of all processing activities as the catalog cards produced by OCLC are received and filed into the catalog files. These card catalogs contain a bare minimum of cross-reference and information notes.

At present, Syracuse University Library is running two parallel systems. This is expensive; and one must expect that at least the card catalog will some day be discontinued. There is also a good deal of uncertainty about the future of the Library's own on-line system in relation to the developing OCLC services—such as acquisitions, serials, loans, and subject access modules which are in the process of development. If the OCLC development proceeds in an orderly and successful manner, does Syracuse face the abandonment of part of or all of its own local on-line system? This is a crucial bibliographic control problem facing the Library administration. Since Syracuse already has the majority of its bibliographic records in machine readable form, such a transition might be easier to contemplate than institutions with predominately manual files and records.

In any case, it is noted here that Syracuse has had to make few organizational changes in order to implement the present OCLC Shared Cataloging System. Syracuse has been a good deal more casual about problems of bibliographic control in its card catalogs, because:

1. The problem of discrepancies in headings and call numbers have not been as serious due to its acceptance of LC records unmodified by local cataloging practice, and a very low proportion of original cataloging in those files;
2. Local cataloging policy has simply dictated that the files will not contain the elaborate cross-reference and information note structure usually considered essential in other university library catalogs; and
3. The card catalog (except for subject headings) is supplemented as an access tool by the on-line Syracuse system.

C. CORNELL UNIVERSITY LIBRARY

The Cornell University Library system is a much larger operation than either Buffalo or Syracuse. Cornell is presently cataloging about 70 to 76,000 titles per year; but a large portion of these titles cannot be processed through the OCLC system because the records are in non-Roman alphabets. Therefore, Cornell has had to retain most of the elements of its pre-OCLC cataloging organization and procedures to accomodate the non-Roman alphabet cataloging. Four OCLC terminals were installed in 1973 to process about 45,000 records per year.

The Cornell Catalog Department organizational structure was similar to pre-OCLC Buffalo. However, Cornell's implementation experience was considerably different than Buffalo. Several feasibility studies were conducted with the help of graduate students from Cornell's School of Industrial Engineering. After the decision to implement had been made by the Library Administration, the Director for Technical Services created a task force made up of supervisors and selected professional and clerical staff mambers in the Cornell catalog Department to plan the actual details of implementation. Cornell has a long tradition of excellence in its cataloging and catalog file maintenance. There was considerabole concern on the part of the staff that this excellence not be compromised by installation of the OCLC Shared Cataloging System. On the other hand, management was concerned that use of the OCLC system bring some savings over the old manual system.

The systems control strategy that was devised by Cornell appears to give the Library its desired level of bibliographic control while providing savings over the previous system.

All searching for Roman-alphabet titles is made on the terminals by two searchers. Searching is recycled twice before being sent to the subject cataloging teams for manual cataloging. The flow of cataloging being put through the OCLC terminals is basically in four streams:

Stream 1: LC RECORDS FOUND IN THE OCLC DATA BASE: These records may either have been supplied by the LC MARC Office or by conversion of manual LC records by one of the other OCLC member libraries.

Stream 2: MEMBER RECORDS FOUND IN THE OCLC DATA BASE: These records have been input by the member libraries as original cataloging.

Stream 3: MANUAL LC RECORDS: These records may come from a variety of printed sources in the Cornell University Library and are supplied at various stages of processing either prior to or after OCLC terminal searching for the record in the OCLC data base.

FIGURE 8 : SUMMARY OF THE CORNELL BIBLIOGRAPHIC CONTROL STRATEGY.

1. Stream one records (LC COPY found in the OCLC Data Base)

   a. Two terminal operators search, retrieve, and annotate a search form with: OCLC control number, LC Call number, Main Entry, and series entry/note.

   b. Cataloging Team Member:

      i. checks shelf list and modifies LC call number as necessary.
      ii. checks series authority file; and modifies series entry as necessary.
      iii. recalls OCLC record at a terminal, makes necessary changes to OCLC record, and orders catalog cards.

2. Stream two records (NON—LC COPY found in the OCLC Data Base)

   a. Two terminal operators do as in 1.,a., but also add all name headings to the search form, and check the name headings against the Cornell public catalog annotating the search form for consistency with the Cornell usage of the name headings.

   b. Cataloging Team Member does as in 1.b.

3. Stream three records (Manual LC Copy—Not in OCLC Data Base)

   a. Cataloging Team Member follows normal manual cataloging routine; but codes record for input at an OCLC terminal.

   b. Catalog Card Typist keyboards record and places into OCLC holding file in on-line system.

   c. Cataloging Team Member recalls record from holding file and proof reads record, makes changes or corrections, and orders catalog cards. Before ordering catalog cards, Team Member must first ascertain that another member library has meanwhile not input the same catalog record. If this has been done, then the team member must edit the record already on the OCLC data base, as is done in 1., b., iii.

4. Stream four records (Original Cataloging)

   As in 3., except that a librarian cataloger does the cataloging.

Stream 4: CORNELL ORIGINAL CATALOGING: These records are created by the various cataloging teams after the above three sources have been exhausted.

Stream one records are quite dependable, and get very little authority checking prior to ordering cards on the OCLC terminal. As at Buffalo, the terminal searcher-operator fills-out a search form copying information by hand from the CRT display screen. But far less information is transcribed than at Buffalo. Only the LC Call number, the main entry, series added entry/note, and the OCLC record control number are recorded on the search form. Other added entries and subject headings are not transcribed.

The two terminal searchers do not verify any of these items in the stream one records; but send the books with the search- input forms to the appropriate subject cataloging team. A non-librarian copy cataloger does the shelf listing. This is a necessary step because Cornell uses the Cutter-Sanborne table to modify LC cutter numbers. The series authority and name cross-reference files are checked as necessary at this stage. The copy cataloger then goes to the OCLC terminal and does the edit with book-in-hand and orders the catalog cards.

Stream two records get considerably more careful scrutiny. In addition to the elements of information recorded on the search-input form for stream one records, the terminal searcher-operator also records all "name" added entries, including subject headings whose names are capable of authorship. The terminal searcher-operator then checks all name headings against the public dictionary card catalog and notes whether Cornell has established the heading for its own files, and if it is a variant form than in the OCLC data base. These books with the annotated search-input forms are then sent to the appropriate subject cataloging team. From the annotations, the copy cataloger can determine whether the name headings can be accepted or must be modified. In addition, the copy cataloger can ascertain whether any cross-references or authority cards must be created for headings new to Cornell's files. The cataloger then indicates any additions or changes to be made in the OCLC member record on the search form. These stream two records may be handled by either a professional librarian or a paraprofessional cataloger depending upon the variances and problems encountered and noted on the search-input form. Each team is free to determine its own division of labor. The cataloger then goes to an OCLC terminal, calls up the record by the OCLC control number, and makes any additions and changes prior to ordering the catalog cards.

Stream three records go directly to the appropriate cataloging team. The same categories of information are checked by the copy cataloger as stream one materials; but in addition, the copy cataloger must annotate and code the manual LC record for terminal input by one of the Card Typists. Since these records involve considerably more keyboarding (i.e., the entire record is input by the Cornell operator), they are placed into a holding file for a proofing cycle before release to the central OCLC data base file. Lower classified personnel are used to do the initial keyboarding since the records are keyboarded in their entirety as straight copy work from the search-input form, and proof-read by the cataloger before card production.

Stream four records are originated in the appropriate cataloging team by a librarian cataloger. The input form consists of a typed coding sheet. Organization of the effort to produce the original cataloging record is again left up to the discretion of the particular cataloging team. There is clerical support for the professional cataloger, if so desired. The finished original cataloging records are also input by the Card Typists with a proofing cycle as for stream three records.

As mentioned above, both stream three and four records go through a proofing cycle. OCLC has arranged storage in its on-line system so that records may be stored in an in-process file to permit a proofing cycle prior to release of the records to the central data base. The in-process records are accessible only to the inputting library because only it knows the OCLC control number which has been assigned to that record. As each record is input, it is assigned a unique OCLC control number. Records are recalled from storage by the control number. Cornell has arranged for each cataloger to proof his/her own work before the record is entered into the OCLC data base. In this way the cataloger has the final control over a record before it is released to public scrutiny in the OCLC data base. This proofing is done on a one-day turn-around basis.

Unlike Buffalo, Cornell has retained its cataloging team structure. Terminal operators are decentralized into various functional units in the Cataloging Department, but largely shared by three groups:

1. OCLC searching is done by two terminal operators assigned to do all preliminary terminal searching.

2. Input of stream one and two records—involving a minimum amount of actual keyboarding because the records are already in the OCLC data base, is done by members of the cataloging teams.

3. Input of stream three and four records—involving the keyboarding of the entire record, is done by card production typists. But final quality control of the record is retained by the originating cataloger prior to release to the OCLC data base.

This decentralization of OCLC terminal activities demands considerable coördination and scheduling of terminal use. The old organizational units of Catalog Card Production and Catalog Maintenance were combined into one unit. One supervisory position was eliminated. The supervisor for the new automated systems unit has control over the terminal scheduling, the terminal searchers, card production typists, and card filers. In addition, the supervisor for the new unit is also responsible for terminal maintenance problems, all training of new personnel who will be using the terminals, and the manual catalog card production system which is not operating in the OCLC Shared Cataloging System.

The Cornell implementation solution is an impressive one in several respects:

1. Cornell was able to retain its desired level of bibliographic control through a strategy of distinguishing the various types of records found in the OCLC data base, and limiting the kind of checking done to parts of these records where considerable variance to the local card catalog could be predicted in advance.

2. Cornell was able to retain sufficient control over terminal activities without resorting to a single administrative unit being responsible for all terminal search and input functions. This decentralization of terminal activities permitted Cornell to retain its cataloging team structure. And it permitted the catalogers to retain considerable control over the input of records which they originated. In addition, unlike Syracuse, Cornell did not have to resort to a duplicate set of OCLC terminals in other areas of the Library.

3. Considerable job control was retained by staff members via participation in implementation planning and retention of the subject cataloging team structure. The importance of this will be discussed in the chapter on job design.

4. Management has also retained a high level of organizational control. Formal production standards have been set, after some negotiation with the supervisors, for the various functions on the terminals. Formal reports detailing terminal productivity are made every week, and management responds to exception reports. These records are at present kept manually .

This concludes the discussion of the bibliographic control solutions which three university libraries formulated in their implementation of the OCLC Shared Cataloging System. But the bibliographic control problems are only one dimension of the organizational control problems which OCLC poses to the implementing university library. The bibliographic control problems emphasize the fairly non-human considerations of fusing the OCLC Shared Cataloging System requirements to the local library's own system requirements. This dimension of control involves the logical-rational elements of technological requirements and work-system design. The second dimension of organizational control remaining to be discussed is the more human dimension involving the control of human behavior through redesign of jobs (which implies closely related issues of job enrichment, job autonomy, and job security), pay compensation, new supervisory requirements, retraining of staff, work standards, and, in general, the positive motivation of staff to accomplish organizational ends. The next chapter will examine the concept of organizational control and the relationship of computer technology to control issues.

CHAPTER 3: ORGANIZATIONAL CONTROL AND COMPUTER TECHNOLOGY

"The control cycle is a basic unit of organizational structure; organizations are composed of large numbers of such cycles in interrelationship. If a cycle breaks down at any point, for whatever reason, control cannot be said to exist... Chronic breakdowns of such cycles imply a breakdown in the organization itself."

Arnold S. Tannenbaum: CONTROL IN ORGANIZATIONS. New York, McGraw Hill, 1968. p.7.

"Work is a process, and any process needs to be controlled. To make work productive, therefore, requires building the appropriate controls into the process of work. ...The first thing to know is that controlling the work process means control of the work, and not control of the worker. Control is a tool of the worker and must never be his master. It must also never become an impediment to working."

Peter F. Drucker: MANAGEMENT: TASKS, RESPONSIBILITIES, PRACTICES. New York, Harper & Row, 1974. p.217.

"A persistent and popular view of modern technology states that it makes man an automaton and an appendage to a machine, performing trivial and repetitive tasks in a way which he has no control. He can make no decisions about what he does, when he does it, and in what order. The automobile assembly line is perhaps the prototype of this image. ...The special fear of [computer] technology must be a fear that the new technology will totally remove, or reduce to an intolerable level, any choices he may have left."

Thomas L. Whisler: INFORMATION TECHNOLOGY AND ORGANIZATIONAL CHANGE. Belmont, Calif., Wadsworth, 1970. p.71.

A. DEFINITIONS OF CONTROL

Control is one of those simple words which in common usage assumes a simple understanding; but upon closer scrutiny the understanding remains neither so simple nor so obvious. There are at least three usages or meanings which should be kept in mind when trying to understand control in organizations.

First, control is used in the sense of to check, to verify, or to audit. This usage remains close to the original French cognate meaning. In this sense, control is synonymous with measurement and information. Most organizations make a large investment in their control apparatus; i.e., their records and records systems. Records provide control in the sense that they are used to establish the facts about what has happened. Since the widespread adoption of computer technology by organizations during the 1950's, design and development of extremely sophisticated management information and control systems has become a large enterprise.

Secondly, control is a normative term which is concerned with what ought to be, or what is expected or desired. Just as the first usage is concerned with looking backwards to establish what has happened, the second usage looks forward to some desired goal or objective. In this sense, control is synonymous with standards or desired outcomes against which past performance can be compared or verified. (1)

The third usage of "control" implies influencing behavior or events so that desired outcomes or standards are achieved. The use of control in all three senses together comprises the conventional engineering concept of a control feedback loop. The formal exercise of control in organizations has traditionally been the prerogative and responsibility of management. But in a much more basic sense, control is the very fabric and structure of the organization itself.

B. CONTROL IN ORGANIZATIONS

Tannenbaum refers to control in organizations as a "special case of social causation", and defines control as "any process in which a person, or group of persons, or organization of persons determines, that is intentionally affects the behavior of another person, group, or organization." (2) With this definition one is immediately plunged into the realms of politics, sociology, and psychology. Control, as defined by Tannenbaum, means control of human behavior towards organizational ends. Control in this sense is synonymous with concepts of power, authority (i.e., the formally delegated right to exercise control), and influence. Control in organizations functions as the primary device to bring about dependability, certainty, and conformance in human behavior.

The bureaucratic model of organization achieves a major portion of control through its design and structure. Labor and responsibility are divided and apportioned for the sake of efficiency. Fractionated processes are tied together and coördinated through a managerial superstructure and hierarchy of authority. There have been many studies which describe the functioning (and malfunctioning) of the bureaucratic model and how its very design and structure establishes a system of checks and balances upon those who exercise control and who are in turn controlled. Especially recommended studies are Blau and Meyer's BUREAUCRACY IN MODERN SOCIETY and Perrow's COMPLEX ORGANIZATIONS.

Other writers of organizational theory have emphasized psychological and sociological mechanisms used for controlling human behavior in groups and in organizations. A useful discussion of the concepts and functioning of roles, norms, and values as social control devices has been written by Katz and Kahn in their book, THE SOCIAL PSYCHOLOGY OF ORGANIZATIONS. This study is especially helpful in understanding the relationships between control and conflict in organizations.

Tannenbaum states that each act of human control has a symbolic as well as pragmatic meaning. The pragmatic meaning implies something about what an individual must or must not do. The symbolic meaning may imply any number of emotionally charged things: superiority, inferiority, dominance, submission, guidance, help, criticism, reprimand, and including manliness or virility. (3) A second point as regards the human experience of control, is that most organizational members prefer exercising control to being powerless.

Thirdly, the experience of exercising control by the individual in the organizational context, can be a major mechanism for the psychological integration of that individual into the organization:

> "Because the exercise of control implies affecting the system in a manner consistent with the intents of the controller, the system is more fully instrumental in meeting the needs of one who exercises control than one who does not... This instrumentality is the basis for the increased involvement in, and identification with the system that are found to accompany the exercise of control." (4)

Thus, control becomes a reward for conformance as well as a means to reap other benefits from the organization. This is another aspect of the symbolic versus the pragmatic meaning of control. Autonomy in the organizational context is thus the capacity to exercise a good deal of control of others behavior; but also includes self—control and determination.

Another relationship which should be kept in mind, is that control is reciprocal in many instances. The more an individual exercises control of others in the organization, the more he is subject to the control of others. It is a two way process with a certain amount of negotiated demands in defining the role structures. Tannenbaum also demonstrates that high degrees of control throughout the organizational levels is found together with high organizational performance. (5) However, this need not be assumed a simple cause and effect relationship. One explanation may simply be that highly effective organizations will tend to be successful organizations, and will tend to have more rewards available for distribution to its membership, which will in turn make more control acceptable to its membership.

At root, the exercise of control and the experience of being controlled in organizations pose the age old issues of conformity and freedom. The benefits and rewards of organizational membership make possible human choice, security, and freedom. But the paradox is that the latter are purchased by giving up a certain amount of choice and freedom via subjection to organizational control. In addition, control tends to be distributed unevenly throughout the typical hierarchical structure, just as the benefits are also disproportionately distributed.

As the quotations from Drucker and Whisler at the beginning of this chapter indicate, some authorities of organizational theory and practice believe that the centralization and concentration of control in many organizations has gone too far. They argue that this has had a number of dysfunctional consequences which have begun to outweigh the original advantages of that concentration and centralization.

For instance, a current control issue is job control and job design. Davis argues that the practice of scientific management and its successors, industrial engineers and methods researchers, have achieved a high measure of control and concommittantly high organizational productivity through the extreme breakdown and rationalization of tasks, but with a number of undesirable consequences. Extreme task specialization in industry, with worker control engineered out of many jobs, has led to worker alienation, apathy, restriction of output, absenteeism, work-to-rule, high turnover, sabotage, etc.

Management's over-emphasis on being in total control of the work and the worker has created its own antithesis: loss of organizational control and the very threat to the continued existence of the organization itself. Emery also argues that the elimination of worker control from jobs is not a technological imperative:

> "The need for close control of the effort-reward relation exerts pressure toward greater and greater breakdown and isolation of tasks into measurable units of individual performance. Many observers have expressed their belief that this process frequently goes beyond what is technologically required." (6)

Kahn agrees with this assessment, and states that the typical management response to worker alienation has been attempts to design the human element even further out of jobs so that a rather vicious, self-perpetuating, self-reinforcing cycle results where there is:

> "increasing reliance on forms of technology and production controls that [are designed] to minimize the effects of worker attitudes on the original product." (7)

Another problem observed by Davis is one of cultural lag. Whereas high technology industry has moved into a "post industrial" phase of job design that restores control to the worker, the service sector has begun to emulate the old job control methodologies that are being discarded in industry:

> "Given the accelerating changes in technology and the social environment, it is probable that appropriate applications of the task and job rationalization strand will diminish in the future, and that it will become increasingly dysfunctional. Disturbingly, while the trend toward post-industrial organization is growing, the task and job rationalization mode is being imported with untutored disregard into the service sector——to that sector's considerable peril." (8)

A whole school of thought and practice has developed in the United States under the general rubric of "job enrichment" and in Great Britain out of the Tavistock socio-technical studies. There has also been a strong development in the Scandinavian countries in the redesign of jobs so that control is restored to the workers. This organizational control issue will be further discussed in the next chapter under the topic of job design.

Tannenbaum offers a partial solution to the dilemma of the distribution of power and control within the organization. His studies of control in a number of organizations confirmed the hypothesis that there is not a fixed quantity of control available for distribution in any one relational system. He attempts to alter the concept of control or power from that of a scarce resource to one of plenty. In addition, Tannenbaum discovered that high amounts of control exercised by all members at all organizational levels is associated with high organizational performance and high member satisfaction. (9) Therefore, it would seem possible, that the rank-and-file could be allowed considerable control in order to foster conditions of organizational identification, motivation, and loyalty; and yet, retain high levels of control within the administrative superstructure. The prerogatives of management need not be compromised, only clarified. (10) Hall cautions that while this may be true in the long run; that in practice, the amount of control available within the organization at any one time is fixed. And that the fixed-amount control-framework can be altered only gradually over time. (11)

In any case, the point to be made here, is that the distribution of control (and hence rewards) in most organizations is uneven and disproportional; that the distribution of control is dynamic, not static, and may be shifted, increased or decreased; and that the participative models of current interest, are not laissez faire models of organizational and member control, but actually require MORE control than more conventional authoritarian and bureaucratic models. As to whether participative models truly achieve egalitarian ideals in practice, or remain essentially another manipulative tool in the arsenal of the same old ruling class, perhaps remains a moot point.

It does seem clear that the trend in many organizations is towards more and more elaborate control. This is necessary because of increased organizational size and scope of activities; because of increasing demands for high organizational performance and productivity; and because of the increasing complexity and requirements of the technologies being adopted by many organizations.

The remaining point to be emphasized, is that the exercise of control of human behavior in organizations is a highly charged emotional and human-values issue, as well as a logical-rational necessity for organizational performance. The exercise of control, or the experience of being controlled in the organization can have dysfunctional consequences both for the organization and for its members. Organizations adopting new technologies, such as computer technology, face a reworking of control issues and control structures within the organization. An organization's ability to cope with these issues and changes will largely determine the future success of that organization.

C. COMPUTER TECHNOLOGY AND CONTROL

Tannenbaum stresses the important relationship between control and information flow; and states that effective organizational performance is not possible without "informed control". (12) Whisler has conducted a number of studies concerning the impact of computer technology on organizational structure. He characterizes computer technology as both an information technology and a control technology:

> "Older technologies were extensions of man's hands and muscles and were his tools and servants, while modern information technology is an extension of man's brain and is his partner—or even his master. Modern information technology is therefore a technology of control. (13)

The conscious design of information and decision systems has become a large technological enterprise since the 1950's. The issues and problems of computer systems control and the application of operations research techniques in business has been well covered by a number of authorities. One excellent summary and anthology of much of the debate has been edited by Sanders in his work, COMPUTERS AND MANAGEMENT IN A CHANGING SOCIETY. Much of this debate about computers and control has been over the distribution of control and decision making within the managerial superstructure, rather than control issues among the rank-and-file.

Whisler argues that the impact of computer technology on organizational control is only just beginning to be felt at the managerial levels of organizations:

> "Information technology——a technology of information signals, and cues——extends the controlling power of man, and the technology can control not just physical processes, but also organizational activities. For the first time a machine has the potential to perform the managerial control function, and the computer has thus become the partner of man at those levels of the organization where control is a major function." (14)

Thus, much of the debate has centered upon what is happening or will happen to the managerial hierarchy. Will middle management whither away, as computer technology enables top management to centralize more of the control functions? Whisler argues that this has indeed been the trend (in those organizations retaining the basic bureaucratic structure), because computers can effectively tie together and integrate vaster amounts of data than could be handled in the previous manual system. Computer technology is itself neutral, and can allow for either centralization or decentralization; but given the typical hierarchical structure; top management has consistently preferred to utilize the technology to shift managerial control upwards in the organization.

Whisler also argues that during the transition to computer systems there may well be a disproportionate shift of control to the computer personnel from the line managers; but that in the long run, this will not be the case, and that the necessity for tighter control on system inputs and outputs, should lead to a clarification and pinpointing of responsibility and authority within the management group. (16)

Nevertheless, computer technology's major impact upon the managerial control structure resides largely in the future. Whisler's findings concerning the impact of computer technology in the insurance industry shows a preoccupation with control issues at the clerical level:

> "Clerks appear to be the chief 'victims' of this tighter control, but it is clear that their supervisors and those who manage the supervisors are also affected, since they are responsible for the proper performance of subordinates." (17)

In some cases, Whisler discovered that because some of the job control function had been shifted from human supervisors to machine control, that many people perceived the situation as a diminishing of control. Also they seemed to prefer the impersonal nature of the machine control to human agent control. (18) Perhaps this preference is related to the symbolic-meaning dimension of human behavior control referred to earlier from Tannenbaum's studies. The preference for the impersonal control of the machine system could be seen as a logical development extending Weber's original bureaucratic model which called for a system of abstract rules and a spirit of impersonal conduct by the bureaucratic official (sine ira et studio).

On the other hand, Walker discovered in his researches that worker reaction to machine control remains essentially ambivalent:

> "An important finding of some case-studies was that conversion of clerical work to a computer demanded higher standards of performance and accuracy and more rigid deadlines, and made it possible to identify employees who made errors. Such aspects of automated jobs were disliked, even where employees considered their jobs to be more important and interesting than before." (19)

In summary, it would appear that control issues raised by computer technology, have so far, in practice, been largely confined to the lower levels of organizational structure. Computers have largely been used, to date, to replace clerical work. It is largely the clerical jobs which have been restructured around computer systems. Computers have made it possible, even necessary, to obtain greater job control; and this has not always been greeted with a positive response from the clerical work force. Computer technology's impact upon the managerial hierarchy, as compared to the clerical work force, has been minimal. Although the potential impact upon management and organization structure pointing towards greater centralization of managerial control and fewer managerial levels in the hierarchy promises to be forthcoming to relatively stable bureaucratic enterprises, it has yet to be widely realized in practice.

The next chapter will deal with an exposition of current job design theory and worker control; and an examination of how some of these issues surfaced in the three libraries described earlier.

CHAPTER 3 : REFERENCES

(1) See Drucker's distinction between "controls" and "control". His definitions were helpful in my formulation of the preceeding definitions. Peter F. Drucker: MANAGEMENT: TASKS, RESPONSIBILITIES, PRACTICE. New York, Harper & Row, 1974. p.494 and following.

(2) Tannenbaum, Arnold S.: CONTROL IN ORGANIZATIONS. New York, McGraw-Hill, 1968. p.5.

(3) *Ibid*., p.307.

(4) *Ibid*., p.308.

(5) *Ibid*, p.309.

(6) Emery, Fred E.: "Characteristics of Socio-Technical Systems" IN Davis, Louis E. and Taylor, James C., editors: DESIGN OF JOBS: SELECTED READINGS. Harmondsworth, Eng., Penguin Books, ltd., 1972. p.178.

(7) Kahn, Robert L.: "The Work Module: a Proposal for the Humanization of Work" IN O'Toole, James, ed.: WORK AND THE QUALITY OF LIFE; RESOURCE PAPERS FOR WORK IN AMERICA. Prepared under the auspices of the W.E. Upjohn Institute for Employment Research. Cambridge, Mass., M I T Press, 1974. p.215.

(8) Davis, Louis E.: Op. cit., p.8.

(9) Tannenbaum, Arnold S.: Op. cit., p.213.

(10) Ibid., p.13.

(11) Hall, Richard H.: ORGANIZATIONS: STRUCTURE AND PROCESS. Englewood Cliffs, New Jersey, Prentice-Hall, 1972. p.232.

(12) Tannenbaum, Arnold S.: Op. cit., p.12.

(13) Whisler, Thomas L.: INFORMATION TECHNOLOGY AND ORGANIZATIONAL CHANGE. Belmont, Calif., Wadsworth Publishing Co., 1970. p.15.

(14) Ibid., p.67.

(15) Whisler, Thomas L.: THE IMPACT OF COMPUTERS ON ORGANIZATIONS. New York, Praeger Publications, 1970. p.106.

(16) Ibid., p.102.

(17) Ibid., p.102.

(18) Ibid., p.120.

(19) Walker, Kenneth F.: AUTOMATION AND NON-MANUAL WORKERS. Geneva, International Labor Office, 1967. p.29.

CHAPTER 4 : JOB DESIGN AND LIBRARY AUTOMATION

"This book, being about work, is by its very nature, about violence—to the spirit as well as to the body. It is about ulcers as well as accidents, about shouting matches as well as fistfights, about nervous breakdowns as well as kicking the dog around. It is, above all (or beneath all), about daily humiliations. To survive the day is triumph enough for the walking wounded among the great many of us."

Louis Terkel: WORKING: PEOPLE TALK ABOUT HOW THEY FEEL ABOUT WHAT THEY DO. New York, Pantheon Books, 1974. p.xii.

"For the many there is hardly concealed discontent. The blue-collar blues is no more bitterly sung than the white-collar moan. 'I'm a machine', says the spot-welder. 'I'm caged', says the bank teller, and echoes the hotel clerk. 'I'm a mule', says the steelworker. 'A monkey can do what I do', says the receptionist. 'I'm less than a farm implement', says the migrant worker. 'I'm an object', says the high-fashion model. Blue collar and white collar call upon the identical phrase: 'I'm a robot.'"

Ibid., p.xiv.

"Working is bad enough, don't bug me. I would rather work my ass off for eight hours a day with nobody watching me than five minutes with a guy watching me. Who you gonna sock? You can't sock anybody in Washington, you can't sock a system."

Steelworker quoted in Louis Terkel, *Op. cit.*, p.2.

A. SOCIO–TECHNICAL JOB DESIGN CONCEPTS

Socio–technical job design concepts attempt to reconstruct jobs and organizational structure by finding:

> "an accomodation between the demands of the organization and the technology on the one hand, and the needs and desires of its members on the other, so that the needs of both are jointly maximized. The studies lend support to the general model of responsible autonomous job behavior as the key facet of individual—organizational—technological relationships in productive organizations." (1)

Davis has conceptualized the historical development prior to the socio–technical job design model as proceeding in four stages:

1. The minimum interaction model.
2. The welfare model.
3. The human relations model.
4. The behavioral model. (2)

This progression has been one of realizing that one hires the whole worker and not simply a pair of hands. (3)

It was not until the founding of the scientific management school in the late 19th century by Taylor, Gantt, and the Gilbreths that work became the object of systematic and "scientific" study. Davis calls this stage a minimum interaction model because it tends towards a mechanistic concept of people as interchangeable parts analogous to their machine component counterparts. The automated, machine–paced automobile assembly line is perhaps the most extreme development of this model. Human motivation is not seen as problematical. The worker is "economic man". It is merely a question of more pay for the greater productivity realized by rigid conformance to the specifications of the industrial engineer or the methods researcher.

The second stage, or welfare model historically developed at a prior period; but comes into its own with the development of the trade union movement. The realization that more than a pair of hands has been hired is translated into ameliorative steps using such non-on-the-job rewards as decreased working hours, vacations and holidays with pay, paid sick-leave, and other fringe benefits. This model states that whereas work and jobs are necessary evils to be suffered by the worker, welfare concerns can in part compensate the worker for his sacrifice. Herzberg called these "hygiene factors" whose absence may cause trouble, but whose presence does not motivate the worker to perform as management requires. (4)

The human relations model developed out of social science research. This model emphasizes the role which management should play in getting the worker to meet job requirements via application of leadership, human relations skills, and persuasion. Many authorities have pointed out the manipulative aspects of this model.

The behavioral model is the most recent development. T-groups, sensitivity training, status and personality development are some of the competing fads. Basically they represent an attempt to change the individual's behavior patterns to meet organizational requirements.

The emphases of the last three models ignore the many important findings about the technological requirements in the organization of work, which the first model emphasizes. In summarizing these developments beyond the scientific management school, Davis states that:

> "many currently fashionable management programs are mere palliatives, addressed to patching up essentially inappropriate organizational and job structures. Among these, the so-called worker communications programs, participation techniques directed at providing workers with 'feelings of importance', and human relations programs dealing with personal-relationships and supervision (often in the abstract, outside of the industrial or business context) do not stand up under objective scrutiny. Almost without exception, their achievements fall short of their own stated objectives." (5)

Hence, argues Davis and other socio-technical job design authorities, one must turn to a restructuring of jobs so that the whole of workers' needs can be realized along with organizational and technological requirements.

The description of what principles compose socio-technical job design varies between authorities; but an emerging pattern is consistent. Kahn defines it as the "humanization of work" and a "process of making work more appropriate, more fitting for an adult human being to perform." (6) He details five requirements:

1. Work should not damage, degrade, humiliate, exhaust, stultify or persistently bore the worker.
2. Work should interest and satisfy the worker.

3. Work should utilize many of the valued skills and abilities which the worker already possesses; and provide opportunity for him to acquire others.

4. It should enhance, or at least, leave unimpaired, his interest and ability to perform other major life roles—as husband or wife, parent, citizen, and friend.

5. It should fulfill the instrumental purpose of getting a living, in terms acceptable to him.

Kahn admits that satisfactory measures have not been devised for these dimensions to work, but feels that measures of job satisfaction probably are the best approach to date. He terms the achievement of this manifesto as a person—environment fit between the motives and abilities of the person and the demands of the job situation. He suggests six needs to be considered in job design: independence, affiliation, achievement, responsibility, self-utilization, and self-development. Thorsrud also summarizes the requirements of socio-technical job design in similar terms: (7)

1. OPTIMUM VARIETY OF TASKS

   Each job will have an optimum variety of tasks. Too few tasks will result in boredom and fatigue of the worker. Too many tasks will result in inefficient training and worker frustration.

2. MEANINGFUL PATTERN OF TASKS

   The tasks comprising a job ought to be structured into a meaningful pattern so that the job has a semblance of a single overall task. Tasks should be such that they involve requirements of different levels of worker attention, effort, skill, etc. so that natural working rhythms can be established.

3. OPTIMUM LENGTH OF WORKING CYCLE

Too short a cycle of tasks means too much time is expended on starting and finishing tasks. Too long a cycle makes it difficult to build up a natural rhythm of work and maintain it.

4. AUTONOMY AND RESPONSIBILITY

Some scope must be given to the worker in setting standards of quantity and quality of production. In addition, suitable feedback must be built into the job so that the worker has knowledge of his results and can take his own corrective actions.

5. AUXILIARY AND PREPATORY TASKS

This is related to autonomy and responsibility. The worker cannot accept responsibility for matters outside of his control.

6. PROVISION FOR INTERLOCKING TASKS, JOB ROTATION, OR PHYSICAL PROXIMITY where:

a. there is a necessary interdependence of jobs,
b. jobs entail a relatively high degree of stress, or where
c. individual jobs do not make obvious, perceivable contribution to the utility of the end product.

In this area, Thorsrud recommends the use of work groups and teams where tasks can be rotated between members.

7. CAREER PATHS

Jobs should be linked into channels of promotion which are sanctioned by the workers.

There is also a large area of agreement by Davis, Kahn, and Thorsrud that responsible job autonomy is a keystone to the whole concept of socio-technical job design. Davis emphasizes the concept by distinguishing between responsible and autonomous behavior: (8)

RESPONSIBLE BEHAVIOR:

a. acceptance of responsibility by the worker or work group for the cycle of activities required to complete the product or service.

b. acceptance of responsibility for rate, quantity, and quality of output.

c. recognition of the interdependence of the worker or work group on others for effective progress of a cycle of activities.

AUTONOMOUS BEHAVIOR:

a. SELF-REGULATION of work content and structure within the job where the job is an assignment having defined inputs, facilities, and outputs.

b. SELF-EVALUATION of performance dependent upon feedback being designed into the job structure.

c. SELF-ADJUSTMENT to changes required by technical variance.

d. PARTICIPATION with management in setting goals or objectives for job outputs.

The role of management is not minimized under these conditions of socio-technical job design. But the management role is different from traditional concepts of that role:

> "The [management] behaviors called for are supportive in providing service, general planning of activities, and evaluation of results on the basis of organizationally meaningful objectives. They stand in contrast to presently overly specific task planning and work measurement, obtrusive supervision, coercive external control, imposed external integration of specialized tasks, and external coördination of fractionated activities." (9)

For a summary of actual applications of socio-technical job design which have been made over the last twenty years to specific work situations and organizations, the reader is referred to two articles to be found in James O'Toole's earlier quoted work: WORK AND THE QUALITY OF LIFE: RESOURCE PAPERS FOR WORK IN AMERICA:

1. Richard E. Walton: "Alienation and Innovation in the workplace."
2. Louis E. Davis and Eric L. Trist: "Improving the Quality of Work Life: Sociotechnical Case Studies."

B. COMPUTER IMPACT UPON CLERICAL JOBS.

Kasl has commented that automation in the office has led to: increased functional specialization; the need for closer supervision; reduced opportunity for social interaction because of constant and close monitoring; greater work pressures because of higher and more rigidly enforced performance standards; reduced job security (as perceived by the clerical worker); and increased feeling that management is impersonal or indifferent. (10) Williams argues that "one of the more noticeable aspects of the computerized white-collar job is that it becomes more like many blue-collar jobs." (11) Williams develops this theme by stating that greater stress is laid on work accuracy and work pacing; that there is decreased flexibility for the worker to determine rate and route of work, and that machine control makes individual performance more visible, thus destroying the traditional anonymity of clerical jobs. (12) Scott as reported by Blum also states that computers appear to be accelerating established trends in the composition of the clerical and administrative work force; and that clerical work has increasingly been simplified, routinized and mechanized. (13) Mumford and Banks have also noted that "the division between manual and non-manual work is breaking down and brings a factory type environment to the office." (14) In trying to summarize the effects of computerization on clerical jobs in two firms studied by Mumford and Banks, the authors concluded:

> "Only two generalisations seem possible. The first is that work content will be more significantly altered if the change to E.D.P. is from a manual rather than a punched card system of work. The second is that staff in the computer area who see themselves as the agents of change will view changes in their jobs more favourably than clerks in affected departments who are on the receiving end." (15)

Generally speaking, the application of computer systems to white-collar offices seems to have largely ignored the recent developments in socio-technical job design. Mumford has warned elsewhere that:

> "Although shop floor managers are starting to appreciate the necessity for building into jobs those factors which motivate the workers and help them to achieve satisfaction and self-development from work, there are as yet no signs of similar developments in management attitudes towards computer systems. Systems analysts show all the defects of engineers in that they appear to see the firm as a technical system designed to achieve only technical and economic objectives. Human beings are necessary but unpredictable links in this system and the object of the systems analyst is to replace these inefficient human links with machine links. If this 'technical' concept of the firm is allowed to develop without modification, there is danger of computers replicating the undesirable features of engineering production systems and producing tightly controlled work arrangements in which people are subordinated to the demands of the machine." (16)

C. SOCIO-TECHNICAL JOB DESIGN IN LIBRARIES.

A careful scrutiny through the journal and monograph index, LIBRARY LITERATURE, revealed no articles on library management that have made use of the research and developments in socio-technical job design summarized in the preceeding sections of this chapter. There is a considerable debate developing in library literature over the changing roles of the professional librarian and the para-professional and clerical library workers. There are an increasing number of periodical articles which deal with management science applications to libraries, along with considerable expressed interest in academic and participatory models of library governance. But this researcher was unable to find any studies which discuss the design of library organizations and the motivation of library staff through application of socio-technical job design principles.

In addition, the literature of library automation has almost exclusively been concerned with technical and economic requirements of computer systems design and implementation. Although many of these articles play lip service to the idea that computer systems in libraries will eliminate the "drudge jobs" and free at least the librarians to do "more professional tasks", such statements are usually expressions of hope or ideology. The emphases in library automation literature are consistent with the remark of Mumford quoted at the end of the previous section. Library systems analysts and administrators also appear to stand strongly in the tradition of industrial engineers and the scientific management school of thought when it comes to the design and implementation of library computer systems.

What does seem clear at this time, is that libraries are just entering into a prolonged phase of technological and organizational changes via the adoption of computer systems applications to library files and records. Library administrators and supervisors will increasingly have to cope with organizational changes imposed by the applications of this technology. The redesign of library organization and job structures presents an opportunity to make use of recent research in order to avoid the mistakes that were made in the industrial sector. The findings of the socio-technical job design research and practice seem to indicate that it is not only appropriate but necessary to consider the human and social dimensions of the work system as well as the technical and economic ones. The ideology of socio-technical job design makes such "humane" considerations respectable even by the standards of the most "hard nosed" of library managers. Davis has gone so far as to state that:

> "Technology is so rich in potential variations and arrangements that design can depend almost exclusively on the social side of the situation. Machinery and tools can be organized in a variety of ways that will achieve the same economic objectives. The real question is what social objectives are to be satisfied?" (17)

D. JOB DESIGN CONSIDERATIONS IN THE IMPLEMENTATION OF THE OCLC SHARED CATALOGING SYSTEM IN THREE UNIVERSITY LIBRARIES.

Flexibility of arranging the same technical system into different social configurations is illustrated to some extent in the three case studies presented in chapter two. All three libraries managed to fulfill the technical requirements of network participation and local bibliographic control, but with varying social, organizational, and job structures.

CORNELL UNIVERSITY LIBRARY

Cornell's implementation of the OCLC Shared Cataloging System and its continued commitment to its subject cataloging team structure incorporates some of the principles of socio-technical job design.

The subject cataloging teams appear to have been granted considerable autonomy over the detailed organization of tasks within each team unit. The Cornell management has not rigidly defined how each team is to accomplish its catalog records production. Instead, it has concentrated on outputs, reaching prior agreement with each team as to quality and quantity of its catalog records production. In this context, the OCLC terminals and data base become just another resource input, albeit a powerful one, which management makes available to the cataloging teams so that they can accomplish their job of producing bibliographic records for newly acquired materials and maintaining bibliographic control and consistency in the card catalogs. Because the OCLC system is a resource which must be shared among several organizational units, management must control the efficient allocation of the resource through scheduling the use of the terminals and provision of proper support services (maintenance, training, and keyboarding help). The Supervisor of the Searching and Catalog Maintenance Group is responsible for the scheduling and allocation of terminal time to the various groups (subject cataloging teams, searchers, and catalog production typists), the proper training and instruction of all staff members in use of the system, and terminal maintenance problems. This management arrangement insures that staff make the most effective use of the OCLC resource while at the same time granting the subject cataloging teams considerable flexibility in how they allocate the various cataloging tasks within each team.

The Cornell cataloging teams retain the major responsibility and control over the production effort for all bibliographic records in the teams' various areas of subject and language expertise. Management provides support services for this enterprise in the form of bibliographic copy searching and procurement, heading checking in the main dictionary catalog, and keyboard input of the manual records not found in the OCLC data base. On the other hand, the teams retain complete authority over the content of the records which Cornell inputs into the OCLC data base via the storage-proofing cycle described in chapter two.

The Cornell University Library Catalog Department was not completely redesigned around the OCLC terminals (as at Buffalo). A team member's tasks performed at the terminals are just a few among a related group of tasks comprising the job of cataloging and catalog maintenance.

In addition, the Cornell management elicited a good deal of staff support and commitment to making the OCLC implementation smooth and trouble free by delegating considerable autonomy to a Catalog Department task force to plan the details of implementation. Thereby, those who would ultimately be responsible for the effective use of the system had considerable voice in the planning and organization of the implementation itself. In this way, management was able to insure that many of the social requirements of the work system were met as well as the technical and economic requirements.

SUNY BUFFALO LIBRARY

The Library of the State University of New York at Buffalo makes a considerable contrast to the Cornell implementation experience. Implementation planning at Buffalo remained largely a management function with little staff input, participation, or consultation. The Buffalo management took a more conventional bureaucratic approach to implementation by creating a separate administrative and functional unit responsible for all OCLC terminal tasks, the Systems Cataloging Section. This is not to say that the Buffalo solution is not an appropriate one. Management is satisfied with the achievement and performance of this new unit. The terminal operators learned their new jobs quickly and with a minimum of instruction. The Buffalo systems cataloging jobs have high status and are avidly sought after by other staff members whenever vacancies occur in the terminal operator positions. The cataloger librarian placed in charge of the Systems Cataloging Section plays a more typically supervisory role over all OCLC terminal activities, than the Cornell Head of the Searching and Catalog Maintenance Unit, who must deal with many staff members not under her administrative jurisdiction or authority.

On the other hand, the functional control at Buffalo was achieved with a number of dysfunctional consequences. The Buffalo subject cataloging teams, patterned after the Cornell teams, were broken-up to create the Systems Cataloging Section. Responsibility and control for bibliographical records production was re-distributed over three functional units at Buffalo. In creating the Systems Support Unit, management assigned the responsibility for controlling heading variance to this unit. All experience and expertise for this function was formerly contained in the subject cataloging teams. The former team members, however, were allocated to the other two functional units. Therefore, a considerable training burden stretching over an eighteen month period was undertaken by management in order to get the Systems Support Unit functioning as it had envisaged.

Buffalo placed the professional librarians into the Original Cataloging Section. These professional staff members lost the most by the administrative changes. It is not surprising, therefore, that management expressed the belief that most of its implementation problems originated from its professional catalogers. The Buffalo management complained that its professional librarian catalogers were deficient in several respects: 1. low productivity; and,

2. poor knowledge and understanding of the OCLC system and hence poor performance of their MARC record coding duties. Management complained that the catalogers lacked motivation to learn the new system and to produce effectively. It is not too difficult to understand the basis of this problem from the librarian catalogers' viewpoint. The administrative changes made to accomodate the OCLC system could easily be seen as representing a great loss in job control and status in the organization. The Buffalo management's implementation solution could hardly be construed as a vote of confidence in the professional staff's expertise or contribution to the library's service effort. They were not considered worthy of consultation about the planned changes. They lost the support services of the clerical staff who were taken from the old subject cataloging teams in order to form the Systems Cataloging Section. The former team autonomy and responsibility for all bibliographic records production was dropped in favor of a functional division and specialization of records production between three new administrative units. And the librarians not being trained to use the OCLC terminals was probably a learning liability as concerns their mastering the MARC coding format. In fact, it soon became common practice for the terminal operators to correct the manual records coded by the librarian catalogers. It seemed that the clerical staff had more expertise in the new system than the professional librarians. In addition, after the librarians had been ordered to concern themselves exclusively with "professional activities" of original cataloging, but without the support services they formerly

enjoyed from the clerical staff attached to the old subject cataloging teams, the Buffalo management reversed itself and asked the professional staff to help the clerical staff in searching for manual LC copy and coding it for terminal input. Although this was a logical solution for coping with the cataloging backlog, it may be understood to have been yet another comment on the professional librarians' status in the new system.

It seems quite likely that the Buffalo implementation resulted in the alienation of its professional librarian catalogers. Although the new Head of the Catalog Department has begun to encourage the librarian catalogers to spend some time using the OCLC terminals, the terminal tasks have remained, to-date, the preserve of the clerical operators. The Buffalo Head of Technical Services has begun to believe that Buffalo's ultimate solution to this problem may be to emulate the Syracuse model and to "engineer" all professional activities, except for administration and supervision, out of the Catalog Department, and to transfer the cataloger librarians to other departments of the Buffalo Library system.

By way of contrast, the Cornell University Library management commented that it was considerably surprised at how quickly and easily its "old hand" librarian catalogers learned the MARC coding format and mastered all OCLC keyboarding activities, and quickly made themselves the teachers and experts for the rest of the staff. At Cornell, the OCLC implementation experience seems to have bolstered the status and expertise of the professional librarian catalogers, rather than diminished it.

SYRACUSE UNIVERSITY LIBRARY

The OCLC terminal operator jobs, as at Buffalo, are high status positions and actively sought after by other library staff members. On the other hand, it was originally the intent of the Syracuse Library management that the residue of original cataloging was to be accomplished in an organizationally decentralized mode, much as the selection and order request activities are accomplished. Instead, the residue of books for which no copy is ever found has remained in the uncataloged backlog arranged by the locally assigned Syracuse control number. Somehow, the collections/reference librarians never seem to get around to doing this original cataloging because of the press of their other duties. The Syracuse Library management is now in the process of considering the return of this function and a number of professional catalogers to the Catalog Department. It is not too difficult to hypothesize some professional attitudes concerning the task of cataloging as a result of the Syracuse job structure. The trained catalogers transferred to the subject divisions are in effect told that the exercise of their professional expertise lies in other areas than cataloging. Any cataloging activity is thus not "respectable" from a professional viewpoint. It is not too difficult to understand why none of these librarians ever seem to have time to work on the uncataloged backlog. It is also not too difficult to predict that there will not be any enthusiastic internal applicants for any new "professional" positions created in the Syracuse Catalog Department.

SUMMARY

In summary, it is not being argued that the Buffalo or Syracuse implementation solutions are inferior to the Cornell solution. Although it does seem likely that the professional staff morale and commitment were better elicited at Cornell than at Buffalo, a little more management sensitivity to what the proposed changes meant to different staff members could have helped to prevent some of the undesirable consequences at Buffalo. This researcher believes that familiarity with the research on socio-technical job design can be of immense benefit to managements which are faced with making such organizational changes.

It may well be that Syracuse must become the model for the small to medium sized academic library as regards the function of cataloging. Such libraries will increasingly need professional staff in their technical services departments only for administrative and supervisory tasks. Whereas, the large research libraries, such as Cornell University Library, will have to retain a strong core of professional staff in their technical services departments because of the vastly different nature of their collecting activities which will continue to demand a large proportion of original cataloging and subject/language skills. The large research libraries will increasingly be able to share the burden of original cataloging with the Library of Congress as the library community is tied together into a national automated library network.

The last chapter of this paper will take a brief look at several other organizational change issues, including job security and resistance to organizational change.

CHAPTER 4 : REFERENCES:

1. Davis, Louis E.: "Job Satisfaction Research: the Post-Industrial View." IN HIS DESIGN OF JOBS: SELECTED READINGS. Harmondsworth, Eng., Penguin Books, ltd., 1972. p.170.

2. Ibid., p.302–303.

3. Drucker, Peter F.: MANAGEMENT: TASKS, RESPONSIBILITIES, PRACTICE. New York, Harper & Row, 1974. p.169.

4. See especially chapter 6 of Frederick Herzberg: WORK AND THE NATURE OF MAN. New York, World Publishing Company, 1966.

5. Davis, Louis E.: Op. cit., p.326.

6. Kahn, Robert L.: "The Work Module: a Proposal for the Humanization of Work." IN O'Toole, James: WORK AND THE QUALITY OF LIFE. Cambridge, Mass., M I T Press, 1974. p.200.

7. Thorsrud, Einar: "Job Design in the Wider Context." IN Davis, Louis E.: Op. cit., p.455–457.

8. Ibid., p.323–324.

9. Ibid., p.325–326.

10. Kasl, Stanislav: "Work and mental health." IN O'Toole James: Op. cit., p.177.

11. Williams, Lawrence: "How Automation Affects the White-Collar Clerical Employee." IN COMPUTER TECHNOLOGY—CONCEPTS FOR MANAGEMENT; PAPERS PRESENTED AT A SYMPOSIUM CONDUCTED BY INDUSTRIAL RELATIONS COUNSELORS, INC. Held at Greenwich, Connecticut, May 7–8, 1964. New York, Industrial Relations Counselors, Inc., 1965. p.20.

12. Ibid., p.21–22.

13. Blum, Albert A.: "White Collar Workers." IN Tavis, Irene, ed.: THE COMPUTER IMPACT. Englewood Cliffs, N.J., Prentice-Hall, 1970. p.74.

14. Mumford, Enid and Banks, Olive: THE COMPUTER AND THE CLERK. London, Routledge and Kegan Paul, 1967. p.183.

15. *Ibid.*, p.194.

16. Mumford, Edid: *COMPUTERS, PLANNING AND PERSONNEL MANAGEMENT.* London, Institute of Personnel Management, 1969. p.20.

CHAPTER 5 : OTHER ORGANIZATIONAL CHANGE ISSUES

"When the people on the receiving end of change have no exact information on how their jobs are going to be altered, they then deduce that alterations are likely to be more severe and damaging to their interests than will be so, and they therefore refuse to accept the new system altogether or ask for an unrealistically high price... Managements always assume that their employees have more information about the consequences of a proposed computer system than they have in fact. They also assume that this information is more accurate than it usually is."

Enid Mumford: COMPUTERS, PLANNING AND
PERSONNEL MANAGEMENT. London,
Institute of Personnel
Management, 1969. p.37.

"In all instances where substantial enhancement of the quality of work life has taken place, it was preceded by a rethinking of management ideology about how organizations and individuals work."

Louis E. Davis and Eric L. Trist:
"Improving the Quality of
Work Life" IN James O'Toole:
WORK AND THE QUALITY OF LIFE.
Cambridge, Mass., M I T Press,
1974. p.278.

"There seems to be a substantial professional library consensus that sees technology as essentially aiding existing library resource development concepts and processes, but possibly with relatively little basic alteration in the library's fiscal resource allocations. There are also suggestions from technologists and others for the very large-scale, on-line, interactive, data- and textual-access systems that would, it is asserted, reallocate resources in such a way as to supersede the library in many or most of its traditional functions. The cited major studies strongly indicate that the first of these positions, if it exists, may not long be found tenable. The second is unlikely to be currently feasible except for very small bodies of data.

Herman H. Fussler: RESEARCH LIBRARIES
AND TECHNOLOGY. Chicago,
University of Chicago Press,
1973. p.76.

A. JOB SECURITY

Similar to other researchers, Walker has noted that the impact of computer technology has largely been confined to the clerical work force in organizations, and that few case-studies have reported the need for those clerical employees displaced by technological change to find work outside of the organization. (1) He further states that when redundant staff could not be absorbed elsewhere in the enterprise, the problem has usually been solved by adjusting recruitment and not replacing staff who leave the organization. Another factor which Walker discovered was that the great majority of employees whose work was displaced by computer technology tended to belong to groups with high labor turnover rates, principally unmarried women. Perhaps one disturbing trend noted by Walker should be quoted here:

> "The survey showed that whereas just over three-quarters of the jobs abolished as a result of the automation of office work in the average undertaking had been held by women, only half of the jobs created were filled by women." (2)

Blum's observations agree largely with those of Walker. Blum notes that employers generally avoid immediate discharges, but that there is frequently a decline in the number of new employees hired over the long run, while attrition and transfers are the immediate techniques used to reduce staff to desired levels. (3) He also observes that the period of installation and debugging usually gives management enough lead time to make the necessary adjustments in staffing levels.

The university libraries which have implemented the OCLC Shared Cataloging System appear to have utilized the same techniques as described above. The three libraries described in chapter two did eliminate several clerical and supervisory positions through normal attrition and transfer. Kennedy, in his survey of OCLC member libraries, emphasizes that the amount of staff displacement varies with the library organization and is directly related to the bibliographic control problems discussed in chapter two:

> "The results of Dartmouth's test of the OCLC system demonstrate the savings that may be realized through the system. It must be noted, however, that all institutions have not, and probably will not realize comparable savings. Dartmouth accepts LC cataloging without question, making very streamlined procedures possible. ...The necessity for continuing to check MARC records against local shelf lists and authority files and to make the required modifications results in higher costs for many libraries. On the other hand, some OCLC libraries are not effectively taking advantage of the system's capabilities and are continuing to do unnecessary checking of records. The in-library costs at Dartmouth may be regarded as near minimum costs which may be achieved by those wishing to accept LC cataloging. The Dartmouth costs for participation in the system are, on the other hand, high because of the cost of extending the line from Pennsylvania to New Hampshire to serve a single library." (4)

Kennedy reports that Dartmouth reduced its technical processing staff of thirty positions by seven (one librarian, two technicians, and three clericals) plus an additional 160 hours per week of student help. The other libraries reported by Kennedy reduced their staffing levels by lesser degrees.

The impact of computer technology on librarian positions remains an issue that is not resolved at this time. Obviously there will be an increasingly reduced need for professional librarian catalogers as more libraries are tied into the OCLC and other Shared Cataloging Systems. One solution to this change might be to increase the ratio of librarians in the public services areas of the library as was done at Syracuse University Library. But this solution would not reduce the total costs of library services, and may not be an acceptable solution in a period of economic squeeze.

Professional manpower planning for libraries is really a problem which must be faced outside the decision framework of any one specific library. Nevertheless, it is a problem whose urgency will increase over time. It will have to be faced by professional associations and library schools.

Walker commented in his study that librarians may be facing a crisis similar to the one faced by the accounting profession:

> "A similar kind of development [to the impact of automation on accountants] appears to be taking place in the work of librarians and archivists, for whom the development of computerized information storage and retrieval systems implies a fundamental reorganization of library functions. Computerized compilation of indexes, bibliographies, etc. will also affect library work. While the integration of library and archivists' in the total operating system of an establishment seems likely to stop short of the integration which will apply to accounting systems, modern technology will have repercussions on the education of librarians." (5)

The above quoted statement is in large agreement with the judgement of Fussler's quoted at the beginning of this chapter. Both would seem to imply that manpower planning needs for libraries will be in the context of a gradually evolving situation rather than a radical discontinuity. This will be easier to accomodate, but it would be foolish and dangerous to ignore the need to plan and make changes in the education and total output of new librarians from the various library schools. This researcher believes that there is a need to reëxamine the profession's needs with respect to continuing education and upgrading of librarian's skills especially in the areas of administration and managing technological and organizational change.

B. COMPENSATION

Does the adoption of computer technology upgrade or downgrade job skill requirements? Does the adoption of such technology lead to drastic modifications in the compensation and reward structure of the organization? If so, in what ways? Does the conscious redesign of jobs using socio—technical design principles lead to staff demands for higher pay?

Blum comments that these types of questions are not very well covered by the research literature of technological change in organizations; but that several generalizations might be ventured.

First, there have not been many general increases in salaries as a direct result of the adoption of computer technology. Thus, the remaining clerical jobs which are not automated continue to be paid at about the same rates as before automation. In those few cases where clerical jobs have been downgraded, management has "red circled" the jobs and incumbents have escaped pay cuts. This method is not without its morale problems, however. Replacements coming into red circled jobs are paid less than their fellow employees for the same kind of work. In respect to changes in job pay classification as a result of adopting computer technology, Caulkins argues that:

> "...most workers are concerned primarily with what they are paid as it relates to what their peers are paid, not as compared with some external standard." (7)

Walker has noted that because there is a tendency to abolish the low-paid jobs, the average pay level in the organization does tend to go up even where there has been little change in actual pay received by the remaining employees. On the other hand, he notes that staff who are transferred to the newly created data-processing units do tend to receive higher rates of pay than they received when doing manual jobs. (8) Mueller observed that the well-educated appear to derive disproportionate benefits from technological advance. (9)

Whisler has described the phenomenon whereby staff members whose jobs are changed by computer technology tend to perceive the changes as an upgrading of skill requirements, even though the opposite may be true:

> "An additional puzzlement is presented by the fact that respondents report both a routinization of clerical jobs and an upgrading of clerical skills. ...Their explanation was that, while activities in the job have indeed been routinized, the demands on the employee have increased. These demands are for greater reliability in performance. ...In computerized systems, it is critical that employees perform precisely the way that the system demands at precisely the time required.
>
> "...These new demands are translated as higher 'skill requirements'. In marketplace terms, this makes sense. A greater demand on the individual requires greater compensation. Although 'skills' seem to have been programmed out of the job in one sense, the net effect appears to be that of asking for greater input, a greater commitment from the individual. To obtain such a commitment, it is necessary to pay more. In terms of wage-and-salary administration, the job is defined as having been upgraded." (10)

As argued in chapter four, those designing jobs for automated systems have tended to follow the practices of industrial engineers and methods researchers rather than the more recent concepts of socio-technical job design. Therefore the reader should not be surprised that Blum observes that job evaluation schemes are becoming more 'appropriate' for clerical work with production standards being set and efficiency experts flocking to offices in order to figure out ways of increasing output. (11) It is in this context that Bright's observations are understandable:

> "During the several years which I spent in field research on managerial problems in so-called automated plants and exploring automation with industrialists, government personnel, social scientists, and other researchers, I did not find that the upgrading effect occurred to anywhere near the extent that is often assumed.

> "I found frequent instances in which management's stated belief that automation had required a higher caliber of work—force skill was refuted when the facts were explored. Other managers admitted, and on several occassions emphasized, that they had made substantial errors in assigning high wage rates to some automated jobs. These wage rates not only proved to be out of line with the difficulty of the task, but were unfair in contrast to the wages of employees working with conventional machinery." (12)

The problem identified by Bright and the staff concerns quoted earlier from Caulkins raise the question of what is the proper basis for compensation for newly automated jobs? And how can appropriate revision of the pay system be introduced into those organizations in technological transition where automated tasks and non—automated tasks exist side by side? The context of Bright's observations are organizations where management has set about eliminating worker control over quantity and quality of output. The worker, in such structures, typically makes fewer production operation decisions and exerts less physical and mental effort. Automation under these conditions does mean a reduction in skill, education, and experience required of the worker. Management's point of view might be stated as the workers should not be paid more where they contribute less to the value of the economic system. The worker's reply is obviously that management will have to pay a premium simply because the jobs are not fit for adult human beings.

As suggested in the previous chapter, the above scenario is not the only one available to management in planning technological change. Socio—technical job requirements can produce quite a different picture of the adoption of computer technology. Davis suggests that if one moves into a system of autonomous work groups that the old differentiated formal job positions may have negative consequences for work group performance. The experience of job changes in higly automated process technology is that skill differences between job classifications are leveled, but that the absolute level of skills goes up, rather than down for the automated jobs. (13) In addition, as a consequence of the increased interdependence between work group members, it is exceedingly difficult, if not impossible, to measure individual contributions to greater quality and quantity of product. (14) Therefore, Davis argues, that under such circumstances, separate job evaluation schemes are dysfunctional; and group evaluation schemes become more effective ways to measure and reward performance.

Caulkins also argues that the effect of job enrichment, in his experience, does imply that one must rethink the compensation system, especially if the manager wishes to retain flexibility in shifting employees to various areas in the organization without regard to pay or status. (15) Therefore, he argues that in this type of job structure it may be appropriate to pay employees on the basis of the skills and jobs they have mastered, rather on the basis of being an incumbent in a particular position. (16) Caulkins concludes that:

> "...this may help to reduce somewhat the compression that has taken place between pay levels of skilled workers and those workers performing more boring, routine tasks. The pay of the latter has been boosted rapidly to maintain staffing on what are essentially undesirable jobs." (17)

No evidence was found in the three on-site visits or in the literature of library automation that management was considering a restructuring of compensation systems along the lines suggested by Davis and Caulkins. Some of the OCLC terminal operators were reclassified when transferred to the new jobs; others were not. There were also attempts to reclassify some of the supervisory jobs created by the reorganizations in the catalog department to accomodate the OCLC Shared Cataloging System. But these job changes belong to the traditional strand of differentiating and classifying job positions rather than incumbent skills and knowledge. Perhaps it is appropriate to conclude this section with some remarks by Bright:

> "It does seem evident, though, that it is a mistake for management to adopt automation without considering how skill requirements of this particular work force, in this particular case, will be affected. It is dangerous to assume that automaticity and skill increases are directly proportional. And is it not clear that we need still more critical thinking and research to improve our understanding of mechanization advances on work-force skills?" (18)

C. RESISTANCE TO CHANGE AND CONFLICT

With the possible exception of the problems concerning the professional librarian catalogers at SUNY Buffalo, this researcher did not discover any significant problems in staff resistence to the organizational changes made at the three visited university libraries. This does not mean that there was an absence of such problems. The implementation experiences of the three libraries were discussed with the respective heads of cataloging and technical services. Their perceptions were largely of a smooth transition and staff acceptance. However, staff members in these libraries were not interviewed. An entirely different picture of the transition might have been engendered if the researcher had interviewed staff members who had resigned or been transferred from the affected areas during many of the described organizational changes.

It is at this juncture that writers usually trot out their platitudes concerning the importance and necessity for adequate management communication and consultation with organizational members whose jobs are going to be changed or affected. This writer cannot disagree. Such platitudes are no less true for their being trite or hackneyed. The administrator should not forget, however, that communication in and of itself does not solve real conflicts. Some organizational members and groups are bound to suffer to greater or lesser degrees by contemplated changes.

Resistance from those who have a good deal to lose by proposed changes is a rational response. It may even be an organizationally appropriate response, especially if those proposing the changes have not given sufficient thought and planning to their proposed changes. One of the manager's primary roles as "change agent" is to be aware of how the costs and benefits of proposed changes will impact various organizational members and groups, so that he can better cope with the consequences of his decisions.

In conclusion, it seems desirable to put the problems of organizational change and conflict into a perspective determined by a model of organizational theory. Perrow has written that conflict is an inevitable part of organizational life which stems more from organizational characteristics that it does from the personal characteristics of individuals in the organization. This concept is central to the administrator in understanding his role in coping with organizational change:

> "...there is a never-ending struggle for values that are dear to [organizational] participants—security, power, survival, discretion, and autonomy—and a host of rewards. Because organizations do not consist of people sharing the same goals, since members bring with them all sorts of needs and interests, and because control is far from complete, people will struggle for these kinds of values. To reduce, contain, or use these conflicts is the job of the administrator. The most important conflicts are those that involve groups, since groups can mobilize more resources, extract loyalty, and shape perceptions." (19)

Another aspect to this problem of organizational conflict which should be kept in mind, is that organizations are complex and are not oriented towards a single goal or set of priorities. Goals pursued by organizations are multiple, and generally in conflict. Perrow further states that:

> "...it is not possible for the head of an organization to fully establish the 'preference ordering' of goals. There may be such an ordering, and it may actually reflect the operative goals, but we cannot count on it. Instead, we have to assume that goals should be viewed as emerging from a bargaining process among groups. Furthermore, they are subject to a learning process. ...Organizations are tools in the hands of their masters, but they are imperfect, not completely controlled, tools, and it is a struggle to maintain control over them." (20)

and

> "Finally, despite the existence of conflicting groups, changing coalitions, and multiple goals pursued in sequence or simultaneously, it is clear that the vast majority of organizations have interpretable goal structures. The people at the top are in a position to win most of the battles and to shape the nature of the contest that goes on below them." (21)

If one accepts Perrow's view, then one accepts the view that highly structured bureaucratic organizations (his neo-Weberian model) remain the predominate and appropriate form for most organizations. It is this writer's view that libraries will remain largely routine organizations for some time to come; and that this bureaucratic model developed by Perrow is the appropriate model for library organizational structure and governance. If one accepts this conclusion, then one must also conclude that the conflicts which libraries will face with the adoption of computer technology are a natural consequence of organizational processes, and will be primarily fought out and resolved within the managerial superstructure. Perhaps the real need for libraries in the future is thus an increasingly professionalized managerial staff able and willing to cope with organizational conflict in a creative and effective manner.

CHAPTER 5 : REFERENCES

1. Walker, Kenneth F. : AUTOMATION AND NON-MANUAL WORKERS. Geneva, International Labor Office, 1967. p.46.
2. *Ibid*., p.55.
3. Blum, Albert A. : "White collar workers." IN Tavis, Irene, ed. : THE COMPUTER IMPACT. Englewood Cliffs, N.J., Prentice-Hall, 1970. p.70.
4. Kennedy, John P. : THE FEASIBILITY OF ESTABLISHING AN OCLC-TYPE CENTER IN THE SOUTHEAST. FINAL REPORT. Atlanta, Ga., 1973. p.20.
5. Walker, Kenneth F.: *Op. cit.*, p.8.
6. Blum, Albert A. : *Op. cit*., p.77.
7. Caulkins, David: "Job Redesign: Pay Implications." IN PERSONNEL , v.51, no.3 (May-June 1974) p.30.
8. Walker, Kenneth F.: *Op. cit*., p.15.
9. Mueller, Eva [and others] : TECHNOLOGICAL ADVANCE IN AN EXPANDING ECONOMY: ITS IMPACT ON A CROSS-SECTION OF THE LABOR FORCE. Ann Arbor, Michigan, Institute for Social Research, The University of Michigan, 1969. p.13.

10. Whisler, Thomas L. : *THE IMPACT OF COMPUTERS ON ORGANIZATIONS*. New York, Praeger Publications, 1970. p.139-140.

11. Blum, Albert A.: *Op. cit.*, p.78.

12. Bright, James R. : "Does Automation Raise Skill Requirements?" IN *HARVARD BUISNESS REVIEW*, v.36, no.4 (July-August 1958) p.86.

13. Davis, Louis E. and Taylor, James C., editors: *DESIGN OF JOBS: SELECTED READINGS*. Harmondsworth, Eng., Penguin Books, ltd., 1972. p.369.

14. *Ibid.*, p.370.

15. Caulkins, David : *Op. cit.*, p.31.

16. *Ibid.*, p.32.

17. *Ibid.*, p.30.

18. Bright, James R. : *Op. cit.*, p.98.

19. Perrow, Charles : *COMPLEX ORGANIZATIONS; A CRITICAL ESSAY.* Glenview, Ill., Scott, Foresman & Co., 1972. p.159.

20 [illegible] p.161.

[illegible], p.163.

APPENDIX: QUESTIONAIRE USED TO GUIDE INTERVIEWS CONCERNING OCLC IMPLEMENTATION AT THE THREE ON-SITE VISITS DURING JUNE 1975.

SECTION I: CONTROL

1. Has considerations of efficient use of the OCLC terminals resulted in scheduling operator use and work shifts? Has closer supervision of staff been necessary to be sure that all necessary terminal time is used? What is the % of available terminal time used at present?

2. CATALOGING ERRORS. Is it possible to distinguish between terminal operator errors, cataloger errors, and other library errors? Is it now easier to trace errors to a specific person? If so, what has been the staff reaction to this change? Is control of errors and consistency of headings more of a problem or less of a problem using OCLC? What are the proof-reading arrangements?

3. CATALOGING POLICY. Has joining OCLC forced reconsideration or changing of any local cataloging policies?

4. How dependable is copy off of the terminal? What is your policy for accepting and checking terminal copy? Do you check the shelf list? series? other?
    a. accept LC-MARC without change or checking?
    b. shared cataloging (i.e. member copy)? by library? or systematically checking all?

5. INCONSISTENCIES AND ERRORS FOUND AT TIME OF FILING CATALOG CARDS. How are corrections made? Is attempt made to update archival record? What procedures are in force for getting new card sets or extra cards?

6. SEARCHING AND CATALOGING. Did installation force change in searching and cataloging routines? Did you do pre-order searching for copy before OCLC? How do you control problem of duplicates? Has OCLC made for better or worse duplicates control?

7. CATALOG CARD CONTROL. Card sets come sorted & ready to file. What checks do you have to see that you get all card sets you have ordered? What checks do you have to see that all cards for a particular card set are received? Is this a problem? Do you get duplicate cards? What do you do about this?

8. ORIGINAL CATALOGING. More or less since OCLC? Do you check OCLC just before entering original cataloging? What % of the original cataloging is found after doing all the work? Who handles these problems? Do you call up copy & change according to your original cataloging work sheet?

9. What authority files did you have before OCLC? Has use of these files changed in any way since adoption of OCLC?

10. Did profiling of your card orders force you to change any policies or procedures? Did you have to change location, holdings, or

format information as portrayed on your card sets?

11. Has the cataloging standards committee put any pressure on your library for changes in what you are doing? Have you tried to influence other libraries or OCLC to make any changes to suit your convenience? Does your library or network have any influence on OCLC policy? or priorities?

12. Have you dropped the LC proof slips or depository file? any other bibliographic tools dropped since OCLC?

SECTION II: JOB DESIGN

1. Have any job descriptions or classifications been changed as a result of OCLC? When was this done? Before or after installation?

2. Is you staff unionized? Did the union present any problems—or in any way help—in making job changes?

3. What staff members operate the terminals? Are various jobs specifically assigned or limited to certain positions or classification levels?
4. Did OCLC make some jobs more or less routine? Does use of OCLC require more or fewer skills? Has the searching task been simplified or complicated?

5. Do any of the staff feel that their jobs are more interesting as a result of OCLC changes?

6. Was any attempt made to apply job enrichment or job enlargement principles to any restructuring?

7. What new jobs have been created as a result of OCLC? What jobs have been eliminated as a result of OCLC?

SECTION III: COMPENSATION

1. Have any adjustments in pay rates or salaries been made as a result of OCLC? Are any planned?

2. What kind of consultation or help has been received from the personnel department? How is personnel handled in the library? Does the library have its own personnel officier?

SECTION IV: JOB SECURITY

1. Have any staff positions been eliminated as a result of OCLC? Any added? Any future plans?

2. Were the staff at all concerned about the security of their own jobs? What kind of reassurance was given by the administration?

3. Are there any union contract requirements concerning job obsolescence and redundancy?

SECTION V: RETRAINING

1. What retraining was given to the staff prior to OCLC installation? What orientation was given prior to installation?
2. What kind of training was given after installation? How long did it take to learn the different functions?
3. What kind of training has been given to staff as back-up to the regular terminal operators?
4. Was any kind of training arranged for staff transferring out of processing?
5. Were staff selected on the basis of willingness to learn?

SECTION VI: RESISTENCE TO CHANGE

1. Has there been any staff resistence to change? Slow downs? Increased absenteeism? Work-to-rule? Sabotage?
2. Was any kind of orientation or information program planned to reduce staff fears and resistance?
3. Are there any staff members or positions upon which the burden of change has been unusually heavy or threatening?

BIBLIOGRAPHY: SOURCES CONSULTED FOR THIS PAPER.

PART I: ORGANIZATIONAL THEORY AND TECHNOLOGICAL CHANGE

Blauner, Robert : ALIENATION AND FREEDOM; THE FACTORY WORKER AND HIS INDUSTRY. Chicago, The University of Chicago Press, 1964.

Blum, Albert A. : "White Collar Workers" IN Tavis, Irene, ed. : THE COMPUTER IMPACT. Englewood Cliffs, N.J., Prentice-Hall, 1970.

Bright, James R. : "Does Automation Raise Skill Requirements?" IN HARVARD BUSINESS REVIEW, v.36, no.4 (July-August 1958) p.85-98.

Caulkins, David : "Job Redesign: Pay Implications" IN PERSONNEL, v.51, no.3 (May-June 1974) p.29-34.

Coch, Lester and French, John R.P. : "Overcoming Resistance to Change" IN HUMAN RELATIONS, 1948, no.1, p.512-532.

Davis, Louis E. and Taylor, James C., editors : DESIGN OF JOBS: SELECTED READINGS. Harmondsworth, Eng., Penguin Books, ltd., 1972.

Davis, Louis E. and Trist, Eric L. : "Improving the Quality of Work Life" IN O'Toole, James, ed. : WORK AND THE QUALITY OF LIFE; RESOURCE PAPERS FOR WORK IN AMERICA. Cambridge, Mass., M I T Press, 1974. p.246-280.

Drucker, Peter F. : MANAGEMENT: TASKS, RESPONSIBILITIES, PRACTICES. New York, Harper & Row, 1974.

Friedmann, Georges: THE ANATOMY OF WORK; LABOR, LEISURE AND THE IMPLICATIONS OF AUTOMATION. Translated by Wyatt Rawson. New York, Free Press of Glencoe, 1961.

Gomersall, Earl R. and Meyers, M. Scott : "Breakthrough in On-the-job Training." IN HARVARD BUSINESS REVIEW, v.44, no.4 (July-August 1966) p.62-72.

Hall, Richard H. : ORGANIZATIONS: STRUCTURE AND PROCESS. Englewood Cliffs, New Jersey, Prentice-Hall, 1972.

Herzberg, Frederick : WORK AND THE NATURE OF MAN. New York, World Publishing Company, 1966.

Kahn, Robert Lester : "The Work Module: a Proposal for the Humanization of Work" IN O'Toole, James, ed. : WORK AND THE QUALITY OF LIFE; RESOURCE PAPERS FOR WORK IN AMERICA. Cambridge, Mass., M I T Press, 1974. p.199–226.

Katz, Daniel and Kahn, Robert Lester : THE SOCIAL PSYCHOLOGY OF ORGANIZATIONS. New York, Wiley, 1966.

Mueller, Eva [and others] : TECHNOLOGICAL ADVANCE IN AN EXPANDING ECONOMY: ITS IMPACT ON A CROSS-SECTION OF THE LABOR FORCE. Ann Arbor, Institute for Social Research, The University of Michigan, 1969.

Mumford, Enid : "Clerks and Computers; a Study of the Introduction of Technical Change" IN JOURNAL OF MANAGEMENT STUDIES, v.2, no.2 (May 1965) p.138–152.

Mumford, Enid and Banks, Olive : THE COMPUTER AND THE CLERK. London, Routledge and Kegan Paul, 1967.

Mumford, Enid : COMPUTERS, PLANNING AND PERSONNEL MANAGEMENT. London, Institute of Personnel Management, 1969.

O'Toole, James, ed. : WORK AND THE QUALITY OF LIFE; RESOURCE PAPERS FOR WORK IN AMERICA. Prepared under the auspices of the W.E. Upjohn Institute for Employment Research. Cambridge, Mass., M I T Press, 1974.

Perrow, Charles : COMPLEX ORGANIZATIONS; A CRITICAL ESSAY. Glenview, Ill., Scott, Foresman & Co., 1972.

Perrow, Charles : "The Effect of Technological Change on the Structure of Business Firms" IN INDUSTRIAL RELATIONS: CONTEMPORARY ISSUES. First World Congress of the International Industrial Relations Association, Geneva, 1967. Edited by B.C. Roberts. New York, MacMillan, 1968. p.205–219.

Perrow, Charles : ORGANIZATIONAL ANALYSIS: A SOCIOLOGICAL VIEW. Belmont, Calif., Wadsworth Publishing Company, 1970.

Sanders, Donald H., ed. : COMPUTERS AND MANAGEMENT IN A CHANGING SOCIETY. 2nd edition. New York, McGraw-Hill, 1974.

Schultz, George P. and Whisler, Thomas L., editors : MANAGEMENT ORGANIZATION AND THE COMPUTER; PROCEEDINGS OF A SEMINAR SPONSORED BY GRADUATE SCHOOL OF BUSINESS, UNIVERSITY OF CHICAGO AND THE MCKINSEY FOUNDATION. Glencoe, Ill., Free Press of Glencoe, 1960.

Tannenbaum, Arnold S. : CONTROL IN ORGANIZATIONS. New York, McGraw-Hill, 1968.

Tannenbaum, Arnold S. [and others] : HIERARCHY IN ORGANIZATIONS. San Francisco, Jossey-Bass Publishers, 1974.

Tannenbaum, Arnold S. : SOCIAL PSYCHOLOGY OF THE WORK ORGANIZATION. Belmont, Calif., Wadsworth Publishing Company, 1966.

Terkel, Louis : WORKING; PEOPLE TALK ABOUT HOW THEY FEEL ABOUT WHAT THEY DO. New York, Pantheon, 1974.

Walker, Kenneth F. : AUTOMATION AND NON-MANUAL WORKERS. Geneva, International Labor Office, 1967.

Walton, Richard E. : "Alienation and Innovation in the Work Place" IN O'Toole, James, ed. : WORK AND THE QUALITY OF LIFE; RESOURCE PAPERS FOR WORK IN AMERICA. Cambridge, Mass., M I T Press, 1974. p.227-245.

Weir, Mary : "The Training Implications of Computer Introduction." IN EUROPEAN TRAINING, v.1, no.3 (Winter 1972) p.304-314.

Whisler, Thomas L. : THE IMPACT OF COMPUTERS ON ORGANIZATIONS. New York, Praeger Publications, 1970.

Whisler, Thomas L. : "The Impact of Information Technology on Organizational Control." IN Meyers, Charles A., ed. : THE IMPACT OF COMPUTERS ON MANAGEMENT. Cambridge, Mass., M I T Press, 1967. p.16-20.

Whisler, Thomas L. : INFORMATION TECHNOLOGY AND ORGANIZATIONAL CHANGE. Belmont, Calif., Wadsworth Publishing Company, 1970.

Williams, Lawrence : "How Automation Affects the White-collar Clerical Employee" IN COMPUTER TECHNOLOGY—CONCEPTS FOR MANAGEMENT. Papers presented at a symposium conducted by Industrial Relations Counselors, Inc. Held at Greenwich, Conn., May 7-8, 1964. New York, I.R.C., Inc., 1965. p.17-32.

PART II: LIBRARY AUTOMATION

ADVANCED TECHNOLOGY LIBRARIES. v.1, 1971- Monthly. White Plains, N.Y., Knowledge Industry Publications.

Bierman, Kenneth John : "Automated Alternatives to Card Catalogs: The Current State of Planning and Implementation." IN JOURNAL OF LIBRARY AUTOMATION, v.8, no.4 (December 1975) p.277-298.

Bregzis, Ritvars : MACHINE READABLE BIBLIOGRAPHIC RECORDS: CRITERIA AND CREATION. Minneapolis, Minn., ERIC, 1970.

Bundy, Mary Lee : "Libraries, Manpower and Automation: Shaping the Future of Libraries." IN LIBRARY TRENDS, v.18, no.4 (April 1970) p.464-485.

Burns, Barrie A.F. : CANADIAN LIBRARY NETWORKS: SITUATION AND PROSPECTS; A DISCUSSION PAPER PREPARED FOR CARL. University of Saskatchewan, 1975.

Cartwright, Kelly : "Mechanization and Library Filing Rules" IN ADVANCES IN LIBRARIANSHIP, v.1, 1970. p.59-94.

COBICIL FINAL REPORT; by Barbara Evans Markuson and others. Indianapolis, Indiana State Library, 1974.

Crum, Norman J. : LIBRARY GOALS AND OBJECTIVES: LITERATURE REVIEW. Washington, D.C., American Society for Information Science, ERIC Clearinghouse on Library and Information Sciences, 1973.

DeGennaro, Richard : "The Development and Administration of Automated Systems in Academic Libraries." IN JOURNAL OF LIBRARY AUTOMATION, v.1, no.1 (March 1968) p.75-91.

DeGennaro, Richard : "Library Automation: The Second Decade." IN JOURNAL OF LIBRARY AUTOMATION, v.8, no.1 (March 1975) p.3-4.

Dolby, James L., Forsythe, V.J., & Resnikoff, R.L. : COMPUTERIZED LIBRARY CATALOGS: THEIR GROWTH: COST, AND UTILITY. Cambridge, M I T Press, 1969.

Dunkin, Paul S. : CATALOGING U.S.A. Chicago, American Library Association, 1969.

Fussler, Herman H. : RESEARCH LIBRARIES AND TECHNOLOGY; A REPORT TO THE SLOAN FOUNDATION. Chicago, The University of Chicago Press, 1973.

THE FUTURE OF CARD CATALOGS; REPORT OF A PROGRAM SPONSORED BY THE ASSOCIATION OF RESEARCH LIBRARIES, JANUARY 18, 1975. Washington, D.C., Association of Research Libraries, 1975.

Hayes, Robert M. and Becker, Joseph : HANDBOOK OF DATA PROCESSING FOR LIBRARIES. 2nd edition. Los Angeles, California, Melville Publishing Company, 1974.

Hendricks, Donald D. : A REPORT ON LIBRARY NETWORKS. September 1973. ERIC Document ED 092-094.

LIBRARY PLANNING AND DECISION-MAKING SYSTEMS; by Morris Hamburg [and others] Cambridge, Mass., M I T Press, 1974.

National Academy of Sciences, Washington, D.C. Information Systems Panel. : LIBRARIES AND INFORMATION TECHNOLOGY; A NATIONAL SYSTEMS CHALLENGE; a report to the Council on Library Resources, Inc. Washington, D.C., 1972.

Pitternick, George : "The Machine and Cataloging" IN ADVANCES IN LIBRARIANSHIP, v.1, 1970. p.1-35.

Project Ballots and the Stanford University Libraries : "Stanford University's BALLOTS System" IN JOURNAL OF LIBRARY AUTOMATION, v.8, no.1 (March 1975) p.31-50.

Rather, John : FILING ARRANGEMENT IN THE LIBRARY OF CONGRESS; AN OPERATIONAL DOCUMENT. Provisional Version. Washington, D.C., Library of Congress, March 1971.

Rather, John : "The Future of Catalog Control in the Library of Congress" IN THE FUTURE OF CARD CATALOGS. Washington, Assn. Research Libraries, 1975. p.58-65.

Shoffner, Ralph M. : "Economics of National Automation of Libraries" IN LIBRARY TRENDS, v.18, no.4 (April 1970) p.448-463.

Slamecka, Vladimir : "Methods and Research Design of Information Networks" IN LIBRARY TRENDS, v.18, no.4 (April 1970) p.551-568.

U.S. National Advisory Commission on Libraries. : *ON THE ECONOMICS OF LIBRARY OPERATION*. Final report submitted to the National Advisory Commission on Libraries. Wasington, D.C., Office of Education, Bureau of Research, 1967.

Veaner, Allen B. : "Institutional Political and Fiscal Factors in the Development of Library Automation, 1967-71." IN *JOURNAL OF LIBRARY AUTOMATION*, v.7, no.1 (March 1974) p.5-26.

Veaner, Allen B. : "Major Decision Points in Library Automation" IN *COLLEGE AND RESEARCH LIBRARIES*, v.31, no.5 (September 1970) p.299-312.

Weber, David C. : "Personnel Aspects of Library Automation" IN *JOURNAL OF LIBRARY AUTOMATION*, v.4, no.1 (March 1971) p.27-37.

PART III: OHIO COLLEGE LIBRARY CENTER

Allison, Anne Marie [and others] : "The Impact of OCLC on Departments Cataloging—A Study" IN *NETWORK; INTERNATIONAL COMMUNICATIONS IN LIBRARY AUTOMATION.* v.2, no.1 (January 1975) p.11-16, 25.

Bayunus, Owais : *A COST ANALYSIS OF THE AUTOMATED SYSTEMS CONTROL GROUP, THE ACQUISITIONS DEPARTMENT AND THE CATALOG DEPARTMENT OF THE CENTRAL TECHNICAL SERVICES, CORNELL UNIVERSITY LIBRARIES*. January 1975. Master's Thesis, Cornell University.

Gross, Mary : "OCLC Cataloging Experiment at Temple University" IN Pennsylvania Library Association. *BULLETIN*, v.28 (May 1973) p.109-113.

Hopkins, Judith : "The Ohio College Library Center." IN *LIBRARY RESOURCES AND TECHNICAL SERVICES*, v.17, no.3 (Summer 1973) p.308-319.

Jones, Robert A. : "Variety of Ways: Cooperation Important to Academic Libraries." IN Ohio Library Association. BULLETIN, v.43 (April 1973) p.11-12.

Kennedy, John P. : THE FEASIBILITY OF ESTABLISHING AN OCLC-TYPE CENTER IN THE SOUTHEAST. Final Report. Prepared by John F. Kennedy with the assistance of Elroy W. Eckhardt. Atlanta, Ga., January 1973.

Kilgour, Frederick G. : "Evolving, Computerizing, Personalizing" IN AMERICAN LIBRARIES, v.3 (February 1972) p.141-147.

Kilgour, Frederick G. : "Initial System Design for the Ohio College Library Center: A Case History" IN Clinic on Library Applications of Data Processing, University of Illinois, 1968. PROCEEDINGS. Urbana, University of Illinois, Graduate School of Library Science, 1969. p.79-88.

Kilgour, Frederick G. : "Objectives and Activities of the Ohio College Library Center" IN Indiana Seminar on Information Networks, Purdue University, West Lafayette, Ind., 1971. PROCEEDINGS. October 26-28, 1971. Compiled by Donald P. Hammer and Gary C. Lelvis. West Lafayette, Ind., Purdue University, 1972. p.33-41.

Kilgour, Frederick G. : "Projects of the Ohio College Center" IN ILLINOIS LIBRARIES, v.55 (May 1973) p.337-339.

Kilgour, Frederick G. [and others] : "The Shared Cataloging System of the Ohio College Library Center" IN JOURNAL OF LIBRARY AUTOMATION, v.5, no.3 (September 1972) p.157-183.

Killean, Daniel B. : REPLICATION REQUIREMENTS: ON-LINE LIBRARY CATALOGING SYSTEM. Prepared for Southeastern Library Network. New Orleans, Tulane University Computer Laboratory, January 1974.

Knieser, Dan L. and Meyer, Betty J. : "On-line Computer Techniques in Shared Cataloging" IN LIBRARY RESOURCES AND TECHNICAL SERVICES, v.17 (Spring 1973) p.225-230.

Koehler, David W. and Shrut, Barry N. : EVALUATION OF A COMPUTER-BASED CATALOGING SUPPORT SYSTEM FOR USE BY THE CORNELL UNIVERSITY LIBRARIES. Master's Thesis, Cornell University, May 1973.

Lyons, Patricia and Northcraft, Margaret : "OCLC, a Users Viewpoint" IN CATHOLIC LIBRARY WORLD, v.4 (December 1972) p.265-268.

Meyer, Richard W. and Knapp, John F. : "COM Catalog Based on OCLC Records." IN JOURNAL OF LIBRARY AUTOMATION, v.8, no.4 (December 1975) p.312-321.

Nitecki, Joseph Z. : OCLC IN RETROSPECT; A REVIEW OF THE IMPACT OF THE OCLC SYSTEM ON THE ADMINISTRATION OF A LARGE UNIVERSITY TECHNICAL SERVICES OPERATIONS. ERIC Document. January 1974. ED 08 7482.

OCLC NEWSLETTER. no.1- Columbus, Ohio, Ohio College Library Center.

Ohio College Library Center. ANNUAL REPORT. 1967/68- Columbus, Ohio, OCLC.

Ohio College Library Center : DESIGN OF FORMATS AND PACKS OF CATALOG CARDS. Columbus, Ohio, State University Libraries, Office of Educational Services, 1973.

Ohio College Library Center : ON-LINE CATALOGING. Columbus, Ohio, Ohio State University Libraries, Office of Educational Services, 1973.

Ohio College Library Center: RECOMMENDED WORKFLOW FOR TECHNICAL PROCESSING AND CATALOGING THROUGH THE OCLC SYSTEM. Columbus, Ohio, OCLC, 1974.

Ohmes, Frances and Jones, J.F. : "The Other Half of Cataloging" IN LIBRARY RESOURCES AND TECHNICAL SERVICES, v.17, no.3 (Summer 1973) p.320-329.

Rubenstein, Nancy F. : THE OHIO COLLEGE LIBRARY CENTER; A PARTIAL BIBLIOGRAPHY. Tiffin, Ohio, Beeghly Library, Heidelberg College, June 1974.

Southeastern Library Network : ANNUAL REPORT, 1973/74. Atlanta, Ga., SOLINET, 1974.

Westat, Inc.: IUC / OCLC NETWORK EVALUATION; FINAL REPORT. Submitted to Interuniversity Council of the North Texas Area [Now Amigos Bibliographical Council] P.O. Box 688, Richardson, Texas 75080. Submitted by: Westat, Inc., Rockville, Maryland 20852. August 31, 1975.